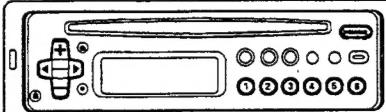




# Service Manual

• DEH-2006RDSZRN and CXA-915RDSZRN



ORDER NO.  
**CRT1664**

HIGH POWER CD PLAYER WITH RDS TUNER

**DEH-2006RDSZRN EW**  
**DEH-2006ZRN X1B/EW**



- These models have been installed in RENAULT ESPACE, CLIO and 19.

Model	RENAULT Part No.
DEH-2006RDSZRN/EW	7700845459
DEH-2006ZRN/X1B/EW	7700845459

- See the service manual CX-540(CRT1574) for the CD mechanism description, disassembly and circuit description.
- The CD mechanism employed in this model is one of CX-540 series.

44123

## CONTENTS

1. SPECIFICATIONS.....	3	8. CIRCUIT DIAGRAM AND PATTERN	34
2. OPERATION .....	3	8.1 CONNECTOR UNIT .....	34
3. DISASSEMBLY .....	9	8.2 CD MECHANISM MODULE .....	38
4. CONNECTOR FUNCTION DESCRIPTION .....	10	8.3 TUNER AMP UNIT .....	44
5. ADJUSTMENT.....	11	8.4 FM/AM TUNER UNIT .....	49
6. ERROR NUMBERS AND NEW TEST MODE.....	23	9. CD MECHANISM MODULE EXPLODED VIEW.....	53
7. ELECTRICAL PARTS LIST .....	25	10. CHASSIS EXPLODED VIEW.....	56
		11. BLOCK DIAGRAM .....	59
		12. PACKING METHOD .....	61

**PIONEER ELECTRONIC CORPORATION**

4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan

PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, California 90801 U.S.A.

PIONEER ELECTRONICS OF CANADA, INC. 300 Allstate Parkway Markham, Ontario L3R OP2 Canada

PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium

PIONEER ELECTRONICS AUSTRALIA PTY.LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL:[03]580-9911

© PIONEER ELECTRONIC CORPORATION 1995

K-FFD.JAN. 1995 Printed in Japan

4956

### ● CD Player Service Precautions

1. For pickup unit(CGY1031) handling, please refer to "Disassembly"(CX-540 Service Manual CRT1574). During replacement, handling precautions shall be taken to prevent an electrostatic discharge(protection by a short pin).
2. During disassembly, be sure to turn the power off since an internal IC might be destroyed when a connector is plugged or unplugged.

### ● Before transporting this product, always perform the following procedure :

1. Insert the test disc (TCD-784) and play track number 2.
2. Switch the source to "tuner".
3. Eject the test disc.

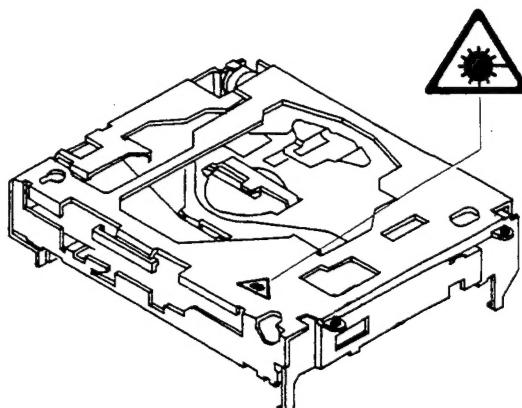
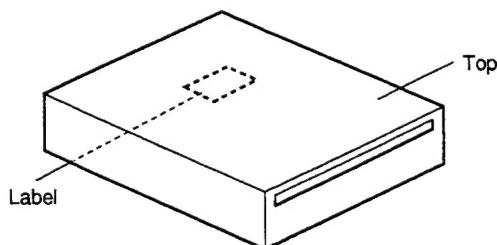
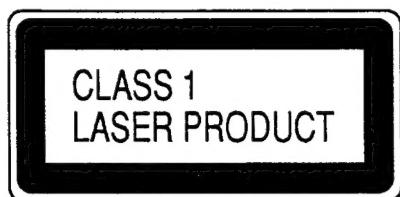
## SAFETY INFORMATION

### 1. Safety Precautions for those who Service this Unit.

- Follow the adjustment steps (see pages 14 through 20) in the service manual when servicing this unit. When checking or adjusting the emitting power of the laser diode exercise caution in order to get safe, reliable results.

#### Caution:

1. During repair or tests, minimum distance of 13cm from the focus lens must be kept.
2. During repair or tests, do not view laser beam for 10 seconds or longer.
2. A "CLASS 1 LASER PRODUCT" label is affixed to the top of the player.
3. The triangular label is attached to the mechanism unit frame.



### 4. Specifications of Laser Diode

Specifications of laser radiation fields to which human access is possible during service.

Wavelength = 785 nanometers

Radiant power = 69.7 microwatts(Through a circular aperture stop having a diameter of 80 millimeters)  
0.55 microwatts(Through a circular aperture stop having a diameter of 7 millimeters)

## 1. SPECIFICATIONS

## General

Power source	14.4 V DC (10.5 — 16 V allowable)
Grounding system	Negative type
Max. current consumption	9 A
Dimensions	
(chassis)	178 (W) × 50 (H) × 150 (D) mm
(front face)	188 (W) × 58 (H) × 20 (D) mm
Weight	1.5 kg

## Amplifier

Max. power output .....	4 x 15 W (DIN45324)
.....	4 x 07 W (DIN45500)
Load impedance .....	4Ω (4 — 8Ω allowable)
Tone controls (bass) .....	±10 dB (100 Hz)
(treble) .....	±10 dB (10 kHz)
Loudness contour .....	+10 dB (100 Hz), +7 dB (10 kHz) (volume: -30 dB)

### CD player

System	Compact disc audio system
Usable discs	Compact disc
Signal format	Sampling frequency: 44.1 kHz Number of quantization bits: 16; linear
Frequency characteristics	5 — 20,000 Hz ( $\pm 1$ dB)
Signal-to-noise ratio	94 dB (1 kHz) (IEC-A network)

Dynamic range ..... 90 dB (1 kHz)  
Number of channels ..... 2 (stereo)

## FM tuner

Frequency range .....	87.5 — 108 MHz
Usable sensitivity .....	11 dBf (1.0 $\mu$ V/75 $\Omega$ , mono, S/N: 30 dB)
50 dB quieting sensitivity .....	16 dBf (1.7 $\mu$ V/75 $\Omega$ , mono)
Signal-to-noise ratio .....	70 dB (IEC-A network)
Distortion .....	0.3% (at 65 dBf, 1 kHz, stereo)
Frequency response .....	30 — 15,000 Hz ( $\pm 3$ dB)
Stereo separation .....	40 dB (at 65 dBf, 1 kHz)

## MW tuner

Frequency range ..... 531 — 1,602 kHz  
 Usable sensitivity ..... 18  $\mu$ V (25 dB) (S/N: 20 dB)  
 Selectivity ..... 50 dB ( $\pm 9$  kHz)

J. W. Turner

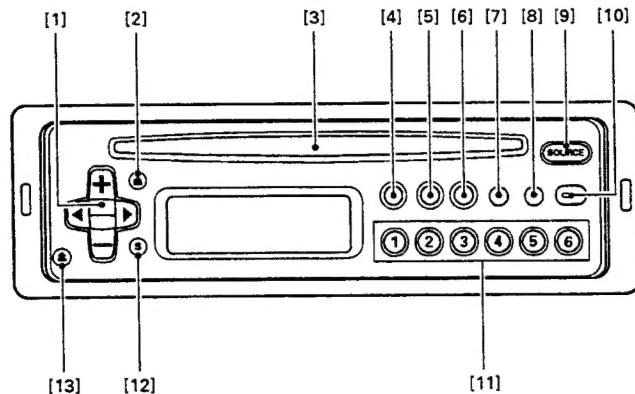
Frequency range .....	153 — 281 kHz
Usable sensitivity .....	30µV (30 dB) (S/N: 20 dB)
Selectivity .....	50 dB ( $\pm 9$ kHz)

**Note:**

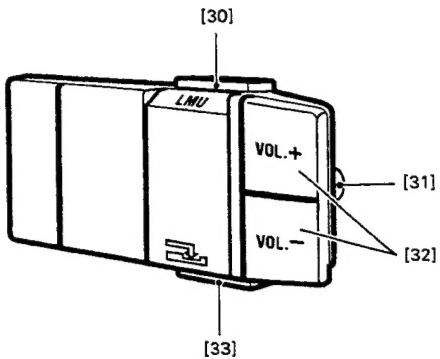
**Note:** Specifications and the design are subject to possible modification without notice due to improvements.

## 2. OPERATION

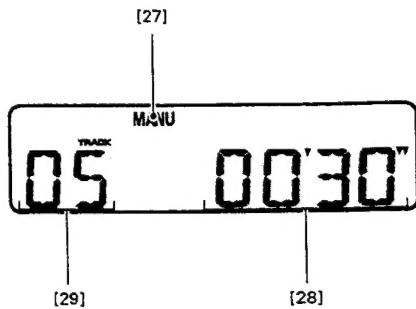
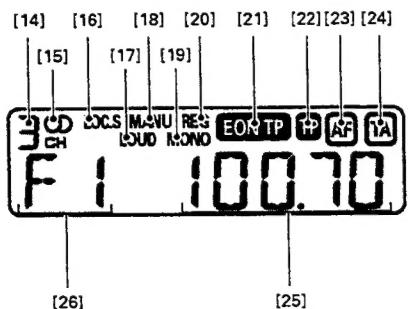
## ● CXA-915RDSZRN(DETACH GRILLE ASSY)



● SATELLITE



## DISPLAY



## Changing the Source

(unfold the page 3)

Parts Identification  
[9] Source

### Changing the Source

Each time the button [9] is pressed, the source will change in the following sequence:

Built-in CD player → AM (MW/LW) → FM →

OFF

- If there is no disc in the built-in CD player, the source will not change to "built-in CD player".
- MW and LW are combined in one band.

## Adjusting the Audio

(unfold the page 3)

Parts Identification  
[1] Volume/Audio adjustment  
[12] Shift  
[17] Loudness

### Volume Adjustment

Pressing the (+) side of button [1] increases the volume, while the (-) side decreases it. (Display shows "VOL 00" ~ "VOL 30".)

- When driving your vehicle, be sure to keep the volume of the unit set low enough to allow you to hear sounds coming from outside.

### Mode Selection

Each press of button [12] changes the mode as follows:

Balance adjustment (FAD/BAL) → Tone adjustment (BAS/TRE) → Loudness adjustment (LOUD)

- When you're adjusting fader, balance, bass or treble, the indicator will stop at the center setting. About 4 seconds after adjustment, the display returns to its previous state.

### Balance Adjustment

Press button [12] to select balance adjustment mode. ("FAD" appears on the display.) Adjust the fader using the (+) or (-) side of button [1]. To adjust the balance, press either the (↔) or (↔) side of button [1] to turn on BAL.

### Fader

Press the (+) side of button [1] to raise the volume of the front speaker only. Press the (-) side of the button to raise the volume of the rear speaker only. (Display shows "FAD F9" ~ "FAD R9".)

- Please set "FAD 0" when using 2 speaker system.

### Balance

Pressing the (↔) side of button [1] shifts the balance to the left speaker, while the (↔) side shifts it to the right speaker. (Display shows "BAL L9" ~ "BAL R9".)

### Tone Adjustment

Press button [12] to select tone adjustment mode. ("BAS" appears.) Select the tone you wish to adjust using the (↔) or (↔) side of button [1]. Press (↔) to switch BAS → TRE. Press (↔) to switch TRE → BAS.

### Bass Adjustment

Select the Bass mode. Pressing the (+) side of button [1] increases bass, while the (-) side decreases bass. (Display shows "BAS -6" ~ "BAS +6".)

### Treble Adjustment

Select Treble adjustment mode. Pressing the (+) side of button [1] increases treble, while the (-) side decreases treble. (Display shows "TRE -6" ~ "TRE +6".)

### Loudness Adjustment

This "loudness" function enhances both the high and low ranges of sound to give even more power to output even at low volume. Press button [12] to select loudness adjustment mode. (The "LOUD" indicator appears on the display.)

Pressing the (↔) side of button [1] turns the loudness function on (LOUD [17] light up), pressing the (↔) side turns it off.

## Protect your radio from theft

(unfold the page 3)

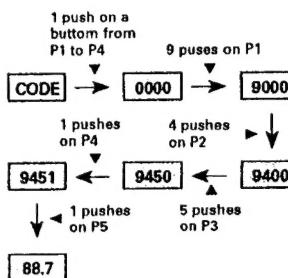
Parts Identification  
[11] ① Entering the first digit  
② Entering the second digit  
③ Entering the third digit  
④ Entering the fourth digit  
⑤ Entry

Your RENAULT radio will not operate once it is removed from the console, making it virtually useless to a thief. The only way to restore power to the radio once it is removed is to enter a four-digit security code unique to your radio. The anti-theft features of your radio operate as follows:

1. The removal of the battery from the car of the radio will render the radio inoperable until voltage is restored and the security code is entered. The radio must be turned on before the code is entered. The word "CODE" will show on the display.

2. To enter your security code number.

For Example: You want to enter the code 9451



Turn the radio on and use the appropriate-numbered radio buttons ① to ④ of [11]. After entering a four-digit code number, press button ⑤ of [11] to validate an entry. A wrong input disables you to enter the code number for 1 minute. Likewise, the code number cannot be entered for 2, 4, 8, 16, and 32 minutes. You should keep the radio turned on during these waiting time.

3. For the sake of safety, never leave your code number in the car. If you should not know the code number, please contact a RENAULT dealer nearest to you. The dealer will contact RENAULT so as to inform you of your code number.

4. If radio or repair becomes necessary, please give the repair facility your radio code number. If you do not, only authorized RENAULT personnel can obtain the code from RENAULT.

### WARNING:

FOR YOUR PROTECTION, CODES WILL NOT BE GIVEN OUT TO ANYONE - UNDER ANY CIRCUMSTANCES - EXCEPT AUTHORIZED RENAULT DEALER PERSONNEL AFTER PROOF OF RADIO OR VEHICLE OWNERSHIP AND PROPER IDENTIFICATION IS ESTABLISHED.

### Preset Scan Tuning

This recalls in sequence all the stations stored in memory under the buttons [1] for 8 seconds each. Press button [5]. (The [14] number will blink.) To cancel, press the button again. After the desired station is tuned, cancel the preset scan tuning. The station will then continue to be received.

- Stations stored in memory under the buttons [1] but whose signal is weak will not be recalled.

### Local Seek Tuning

When the local mode is set, the seek tuning's sensitivity level will become high and only stations with a strong signal will be seek tuned. The local mode's seek sensitivity can be adjusted.

#### Setting the Local Mode

Press button [4]. (The "LOC.S" [16] will light.) To cancel the local mode, press the button again.

#### Adjusting the Local Seek Sensitivity

There are 4 local seek sensitivity steps for FM and 2 steps for MW/LW.

- LOC-4 is the highest seek tuning sensitivity level. Only the stations with a strong signal are tuned. LOC-3, LOC-2, and LOC-1 in descending order enables the tuning of stations with a respectively weaker signal.
- Set to local seek sensitivity adjustment mode. Press button [4] for at least 2 seconds. (The current sensitivity level "LOC-2" will be displayed.)
- The local seek sensitivity adjustment mode will be canceled after about 5 seconds.

2. Adjust the sensitivity level by pressing (◀) or (▶) of button [1].

### FM Monaural Reception

If a stereo broadcast has a lot of noise, switching to the monaural reception mode will reduce the noise. Press button [6]. ("MONO" [19] will appear on the display.) To cancel, press the button again.

### Using the RDS Function

#### What is RDS?

RDS (Radio Data System) according to a CENELEC EN50067 is a system for transmitting data signals from FM broadcast transmitter along with the normal sound program. These data signals, which are imperceptible to listeners, are intended to aid radio listeners in tuning their receivers to a desired station. RDS receivers can decode these data signals for display or control purposes. RDS digital signal includes various data, such as PI, PS, AF, TP, TA and EON.

PI.....Program Identification Code  
PS.....Program Service Name  
AF.....List of Alternative Frequencies  
TP.....Traffic Program Identification Code (Similar to SK signal of ARI system)  
TA.....Traffic Announcement Code (Similar to DK signal of ARI system)  
EON.....Enhanced Other Network Information Code. (In some countries, EON is not offered by broadcasters.)

#### RDS Function of this Unit

This unit has the following functions for making use of RDS data.

- PS, the name of the currently listened station is displayed.
- AF (Alternative Frequency) function. This enables the receiver to automatically retune to more suitable frequencies transmitting the same program.
- TP/TA, EON, user selectable reception of the traffic information service, offered by RDS.

#### Network/Station Name Display

Switch the tuner on and choose one of the three FM bands.

When you tune into an RDS station with manual or seek tuning, the frequency display changes to the network/station name display after a few seconds by means of the PS code.

- The RDS functions of this unit use RDS codes transmitted along with FM broadcasts. RDS doesn't work on the MW or LW bands.
- The RDS functions may not work properly in areas where the RDS transmissions are at an experimental stage or where there are flaws in the broadcasting system.
- Press button [6] for two seconds or more to switch to frequency display. The frequency will only be indicated when the button is pressed.

### Using the Tuner

(unfold the page 3)

#### Parts Identification

[1] Tuning Seek/Manual Local Seek Sensitivity  
[4] Local mode  
[5] BSM/Preset Scan  
[6] FM Monaural  
[7] AF/REG  
[8] TA/EON  
[9] Source  
[10] Band  
[11] Preset  
[14] Preset Number  
[15] FM Stereo  
[16] Local mode  
[18] Manual  
[19] FM Moneural  
[20] REG  
[21] EON  
[22] TP  
[23] AF  
[24] TA  
[25] Frequency  
[26] Band

#### Electronic Tuner

Frequency allocation differs depending upon the area. This unit has been designed in accordance with the frequency allocations for Western Europe, Asia, the Middle and Near East, Africa, Australia and Oceania. Use in other areas may result in improper reception of AM. The RDS function does not work in regions with no RDS broadcast services.

#### Listening to the Radio

- Select MW/LW or FM band by pressing source button [9].
  - For details, refer to "Changing the Source" on page 4.
- FM consists of 3 bands. Select the band by pressing button [10]. Each time the button is pressed, the band will change in the following sequence:  
FM1 → FM2 → FM3
- Use seek tuning or manual tuning to tune to a radio station.
- Set the tuning mode to "seek" or "manual" by pressing the (◀) and (▶) sides of button [1] simultaneously. Repeat this operation to switch to the other tuning mode. (When the manual tuning mode is set, "MANU" [18] will be displayed.)

- 3-2. Tune by Press (◀) or (▶) of button [1]. (When there is a stereo broadcast, "CD" [15] will be displayed.)

#### Seek Tuning:

When the button is pressed, stations whose signal strength is above a certain level will be tuned automatically.

#### Manual Tuning:

When the button is pressed, the frequency will change by one step up or down.

### Using the Preset Memory

The radio stations can be stored in memory under buttons 1 to 6 of [11].

- Tune in to the station to be stored in memory.

2. Store the station in memory by pressing one of the buttons (1 to 6) for at least 2 seconds. When the [14] number stops blinking, the station will be stored in memory under the button pressed.

- Up to 18 FM stations and 6 MW/LW stations can be stored in memory.

### Preset Tuning

The radio stations stored in memory can be recalled by pressing the respective button 1 to 6 of [11]. The station stored under that button will be recalled. (The number of the button pressed will be displayed at [14].)

### Using the Best Stations Memory (BSM)

The radio stations having a strong signal can be tuned automatically and stored in memory under buttons 1 to 6 [11]. Press button [5] for at least 2 seconds. (The "BSM" will blink.) After "BSM" stops blinking, the stations will be stored in memory under buttons 1 to 6 of [11].

- BSM can be canceled mid-operation by pressing button [5].
- The stations will be stored under buttons 1 to 6 in the order of their signal strength. The strongest station will be stored under button 1, followed by stations with lower signal strengths.
- If there are fewer than 6 stations whose signal is strong, there will be spare memory.
- It will take almost 30 seconds for BSM to be completed.

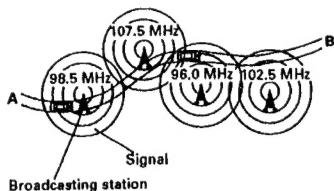
①

**AF Function**

This receiver retunes automatically to a more suitable transmitter, contained in the list of Alternative Frequencies (AF), to enable the motorist to keep listening to programs in the same network.

**Example:**

If a motorist travels as shown below, from point A to point B, (and has selected AF function) then the receiver will automatically retune to a more suitable frequency transmitting the same program. This is shown by the automatic retuning from 98.5 MHz to 107.5 MHz to 96.0 MHz to 102.5 MHz.

**To activate the Alternative Frequency**

Function, hold down button [7], "AF" [23] will appear on the display. Once tuned to a RDS station, as long as you drive within an area served by the same network, the receiver will automatically retune to a more suitable station transmitting the same program, by utilizing the data in the AF list.

• "PI SEEK" will appear on the display, if the AF function has been selected, and a suitable AF station cannot be found. In this case, the receiver will mute the radio sound and search the frequency band, in order to find a station with the same PI code. The receiver will return to the original frequency if the same or related PI code can not be found.

**The AF function will not work in the following cases:**

- when the receiver is tuned to a non-RDS station. (local station)
- when the RDS station does not transmit any AF list data.
- when the receiver can not receive the AF list due to disturbances.

When the receiver is unable to find a PI code the "AF" [23] indicator will flash on the display.

Thus indicating that the AF function can not be performed.

**Preset recall**

• When recalling preset stations in the AF mode, the tuner will be tuned to the stored frequency and the AF function will be operative i.e. when the signal of the recalled station is weak or has a different PI, the radio will look into the AF list and if necessary start a PI seek in order to find a station with the same or related PI code.

When the tuner is performing a PI seek "PI SEEK" is shown on the display.

If the PI seek is successful, the tuner will be tuned to the new frequency that transmits the same programme service (i.e. with the same PI code) and the display will show the stored PS.

If the PI seek is not successful, the tuner will return to the stored frequency. If a new station (with a different PI code) would be received on this frequency, this station will become audible. The display will show the frequency instead of PS.

• When recalling preset stations in the AF=OFF mode, the tuner will be tuned to the stored frequency and the display will show the stored PS. In case the tuned station has a PI code that is different from the stored one, the tuner will accept the new PI code and stay tuned to the initial frequency. The display will show the new PS when the signal of the tuned station is strong enough.

**Listening to Regional Stations**

In some countries a particular programme service may "opt out" during a certain part of the day in several regional variants at particular locations. Since these regional variants are broadcasting a different programme they temporally have a PI and a PS that is different from the main programme service. The PI's are mostly "generically linked". The AF list may either be common for all regional variants or each regional variant may have its own AF list.

In other countries there may be regional stations which are not an "opt out" of a particular main programme service but which have an independent existence. These regional stations all have a different PS. Their PI's may be "generically linked" and their AF lists may carry frequencies which are alternatives for that regional station only.

**1) Regional OFF Mode**

In the default condition, with the AF button [7] switched ON, the receiver is in the REG OFF mode. In this case the receiver will switch automatically to regional variants of the tuned programme service along the journey. This is of benefit when the regional variants just carry the same programme, but will become annoying if the receiver switches back and forth between different programmes. In this case it is recommended to put the receiver in the REG ON mode.

**2) Regional ON Mode**

When the radio is put in the REG ON mode, the radio will remain tuned to a specific regional variant as long as it is available. Press button [7] for two seconds or more to put the radio in the REG ON mode. "REG" [20] will appear on the display. Press down button [7] for two seconds or more to cancel the REG ON mode, i.e. to put the radio back in the default REG OFF mode. "REG" [20] will disappear from the display.

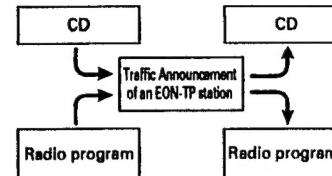
**Traffic Information Reception****TP and EON-TP function**

When a traffic information station (TP station) is selected, "TP" [22] lights on the display, thus indicating traffic report can be received through this station. The "EON TP" [21] indicator will light on the display when a selected station (this network) is broadcasting EON information which cross-references at least one program service which carries traffic information, thus indicating traffic report can be received through another program service by using the EON function of this unit.

In both cases, by briefly pressing button TA [8], Traffic report waiting status will be entered. However, if you wish not to interrupt your radio program (e.g. classical music program) by traffic report, the EON function of this unit can be set to OFF. Pressing button [8] for more than 2 seconds, changes the status of the EON function, EON ON = EON OFF.

This indication is shown on the display for approximately 3 seconds.

If only the "EON TP" [21] indicator is on but the EON function of this unit is OFF, it is not possible to receive traffic report through another program service. In this case, "TA" [24] (if traffic report waiting status is set to ON) will flash on the display to indicate this situation.

**Traffic information reception by EON-TP****Traffic Announcement Volume Adjustment**

- The volume level for traffic information broadcasting is temporarily stored in memory. The next time you listen to traffic information, the previous volume level is used. If the volume level you receive is lower than the previous setting, the volume is not reduced, but set to VOL 15.

**TA Reception during CD play**

- If the radio is already set to the FM band and tuned to a TP or EON-TP station, even when listening to the CD player, when the button [8] is pushed ("TA" [24] is shown on the display), traffic report waiting will begin. When a traffic report begins, the system will switch from CD to the traffic report.

**BSA function**

- While button [8] is on, ("TA" [24] is shown on the display) and AF is off, and you are listening to CD player, should the TP station become weak, the radio will start BSA (Best TP Station Auto Search) 10 seconds after "TP" [22] disappears from the display. The tuner will automatically tune to the strongest TP station in the area, and will stand by for a traffic bulletin. BSA does not work when the AF function is selected, press button [7] to turn the AF function off.

**TP Alarm Function**

- In AF mode, about 30 seconds after "TP" [22] disappears from the display, which occurs if the signal from the TP station becomes weak, an alarm sounds for 10 seconds to tell you to tune to another TP stations.

### Listening to the CD Player

- With the label side up, insert a disc into [3]. Playback will start. (The track number [29] and playback time [28] will be displayed.)
  - Do not insert the disc with the label side down. Doing so may scratch the disc.
  - If the disc stops midway while it is being inserted or if there is no playback after a disc is inserted, something may be wrong with the disc. Eject the disc and check it.
- Turn ON/OFF the disc playback. Press button [9] to change the source.
  - For details, refer to "Changing the Source" on page 4.
- Eject the disc by pressing button [2].
  - For 12cm CD, in the disc is not removed within 10 seconds after ejection, it will be inserted again.
  - For 8cm CD, do not leave the disc halfway into the unit as shown below. Doing so may cause the disc to be bent or dropped.



### Auto Stop

When playback of the final track ends during normal play, the unit switches back to the original source.

### Using Track Number Search, Fast Forward and Reverse

- Set the mode to "track number search" or "fast forward and reverse". Press the (◀) and (▶) sides of button [1] simultaneously. Each time this is repeated, the mode will switch between the track number search mode and fast forward and reverse mode. (When the fast forward and reverse mode is set, "MANU" [27] will light.)
- Execute a track number search or fast forward and reverse by pressing (◀) and (▶) of button [1].
  - Playback sound can be heard during fast forward and reverse.

### Pausing

The disc playback can be stopped temporarily by pressing ① of button [11]. (The "PAUSE" will be displayed.) To cancel the pause, press the button again.

### Repeat

- To repeat the music you are listening to, press button ② of [11] ("RPT" will appear on the display).
- To cancel music repeat, press button ② of [11] to turn off "RPT".

### Random Play

- To play music randomly, press button ③ of [11] ("RDM" will appear on the display). Once the current track has been played, the microprocessor will randomly select the next and subsequent tracks.
- To cancel random play, press button ③ of [11] to turn off "RDM".
  - Since selections are played in random order, the same selection may be played twice in succession.

### Error Display

If there is a problem with CD playback, an error code will be displayed.  
(Ex: "ERROR-10")  
If an error is displayed, refer to the table below to identify the problem. If the error is displayed even after corrective action is taken, contact your dealer or the nearest authorized PIONEER Service Station.

D: Display

C: Cause

T: Treatment

D: ERROR-11, 12, 14, 17, 30

C: The disc is dirty.

T: Clean the disc.

D: ERROR-11, 12, 17, 30

C: The disc is scratched.

T: Replace the disc.

D: ERROR-11, 14, 17

C: The disc is inserted with the label side down.  
T: Insert the disc with the label side up.

D: ERROR-14

C: An unrecorded CD-R is being used.

T: Check the disc.

D: ERROR-10, 11, 12, 14, 17, 30, A0

C: Electrical or mechanical fault.

T: Turn off the car's ignition and turn it back on again. Or change the source to another one and then change it back to CD.

D: HEAT

C: The CD player's internal temperature is high.

T: Wait until the CD player's internal temperature goes down.

### Tuning Functions on each RDS modes

Tuning Mode	AF Mode	TA Mode & AF plus TA Mode
Seek Tuning will stop to find,	RDS Stations	TP or EON-TP Station
BSM will select and memorize in presets,	RDS Stations	TP Stations

Non-RDS station such as those using the Swedish MBS system may be tuned in as RDS station, but this is due to both systems using the same 57 kHz subcarrier frequency and is not a malfunction of the unit.

### Tuning Steps

The tuning step is normally 50 kHz during seek tuning on an FM band. However this tuning step changes to 100 kHz when the set is in AF or TP mode. In some countries it may be desired to set a tuning step of 50 kHz in AF mode by holding down the ① of button [11] while turning the ignition key from OFF to ON.

- During manual tuning, the step does not change; it remains fixed at 50 kHz.
- The tuning step will return to 100 kHz if the batteries supply is temporarily disconnected.
- In AF mode, only those stations being broadcast at 100 kHz steps are subject to AF reception (CENELEC STANDARD).

### Playing Compact Discs

(unfold the page 3)

#### Parts Identification

(1) Track Number Search  
Fast Forward and Reverse  
(2) Eject  
(3) Disc Insertion Slot  
(9) Source  
(11) ① Pause  
② Repeat  
③ Random play  
(27) Manual  
(28) Playback time  
(29) Track number

#### Discs

- Only use compact discs (optical digital audio discs) bearing the mark shown below.



- Do not use cracked, scratched, or warped discs.
- Do not touch the disc's playing side. Handle the disc as shown below.



- Do not affix any label on the disc.

- Do not apply any vinyl record spray, anti-static agent, benzene, paint thinner, or any other volatile chemicals.

- Do not play a dirty disc. Use a soft cloth to clean a dirty disc as shown below. Wipe the disc outward from the center.



- Do not place the disc in high temperatures and direct sunlight.
- Be sure to store the disc in its case.

#### CD Playing Environment

- Disc playback may be interrupted by sudden road shock.
- When the air temperature is low and the car heater is turned on, condensation on the disc and internal parts of the unit may prevent proper playback operation. If this happens, turn off the unit and wait one hour until the condensation is gone. Also, use a soft cloth to wipe off any condensation from the disc.

## Using the satellite (remote control unit)

(Unfold the page 3)

### Adjusting the Audio

#### [32] Volume/Attenuator

##### Volume

Pull the (+) side to raise the volume. Pull the (-) side to lower the volume.

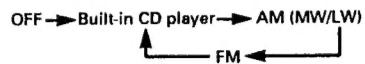
##### Attenuator

Simultaneously pulling the positive (+) and negative (-) sides of the button [32] decreases the sound volume immediately by 20 dB. Pulling either of them again will resume the sound volume.

### Changing the Source

#### [30] Changing the Source

Press the button for two seconds or more to switch the source OFF as follows.



### Using the Radio

#### [30] Switching the source

Press the key for 2 seconds or more to switch the source as follows:

#### [31] Preset stations

It is possible to recall broadcasting stations stored in the memory of the preset button. Switch the channel using the dial.

#### [33] Seek Tuning/BSM

##### Seek Tuning

When the button is pressed, stations whose signal strength is above certain level will be tuned automatically.

##### Best Stations Memory (BSM)

Press the button for two seconds or more to activate the BSM function.

## Using the CD Player

#### [31] Track Number Search

Turn the dial to search for the desired track (track number) in the disc currently being played.

#### [33] Pausing

1. Press this button to pause during disc playback.
2. Press the button again to release the pause.

## Illumination

Illumination of this unit can be reduced by turning ON the light switch.

### 3. DISASSEMBLY

#### ● Removing the Case

1. Remove the three screws.
2. Insert and turn a flat screwdriver at locations indicated by arrows to remove the case.

#### ● Removing the Detach Grille Assy

1. Press the detach button, and then pull detach grille Assy.

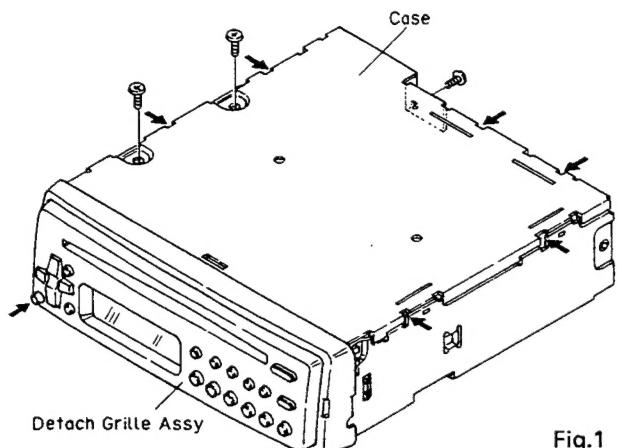


Fig.1

#### ● Removing the Chassis Unit

1. Remove the two screws C and two screws D.
2. Remove the screw E.
3. Stretch the claw.
4. Remove the chassis Unit.

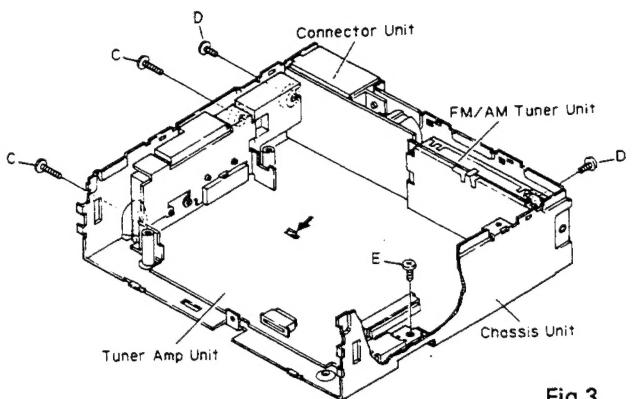


Fig.3

#### ● Removing the Panel Assy

1. Remove the screw B and disconnect the two stoppers indicated by arrows.
2. Disconnect the connector, and then remove the panel assy.

#### ● Removing the CD Mechanism Module

1. Remove the four screws A.
2. Disconnect the connector.
3. Remove the CD Mechanism Module.

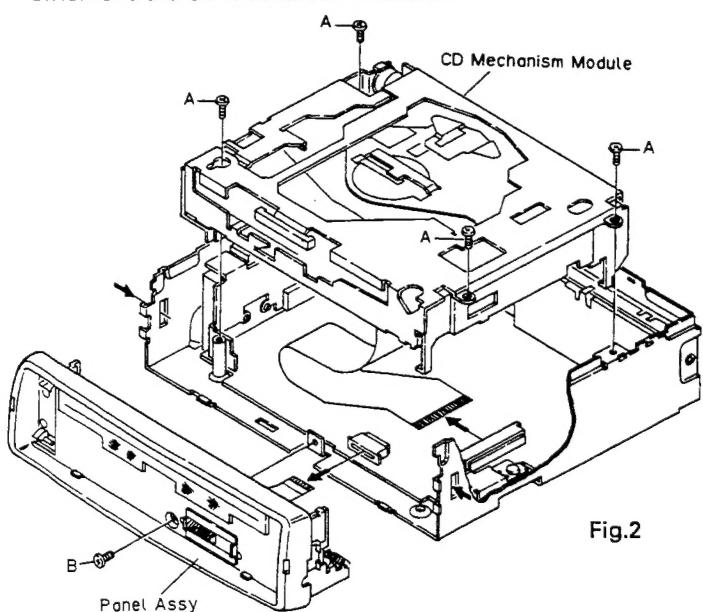


Fig.2

#### 4. CONNECTOR FUNCTION DESCRIPTION

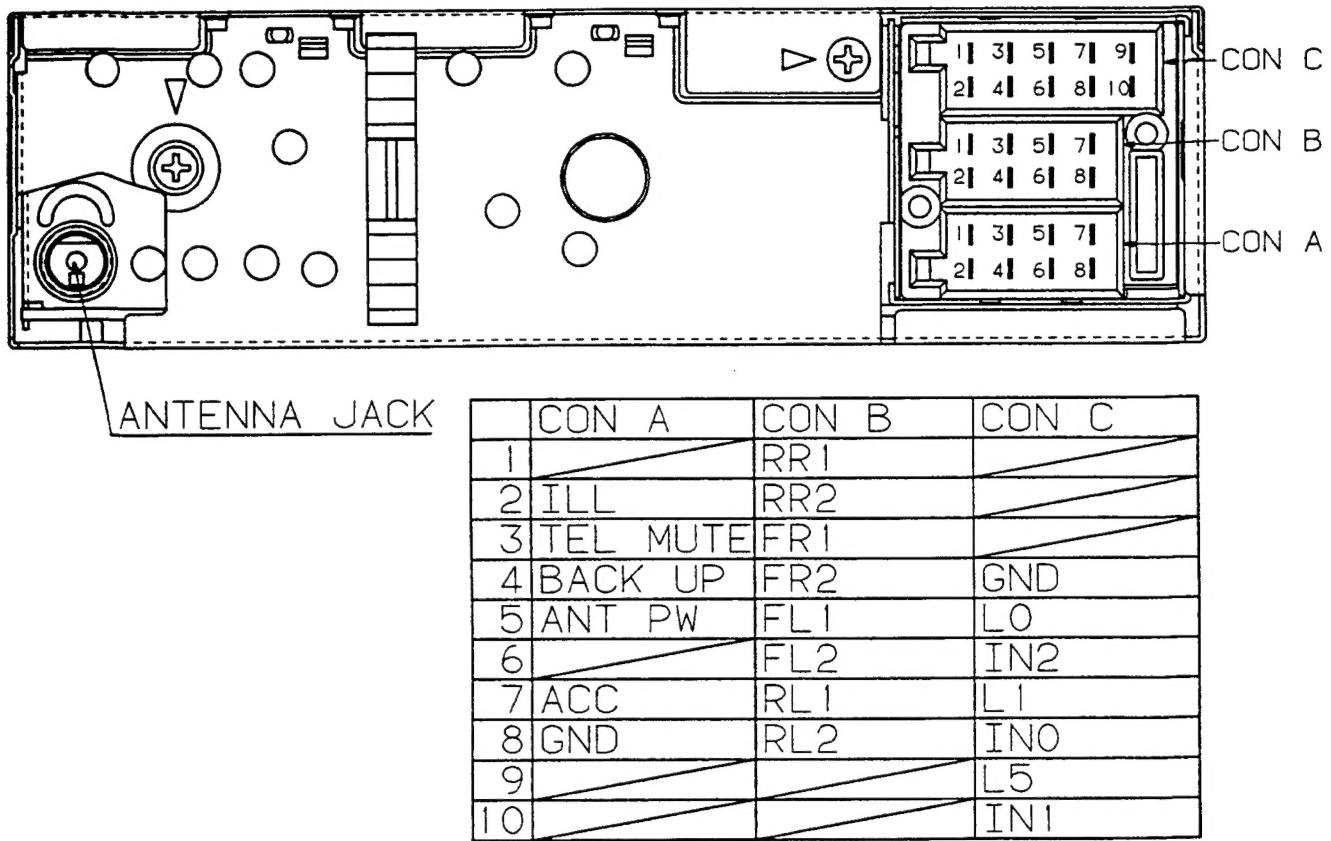


Fig.4

## 5. ADJUSTMENT

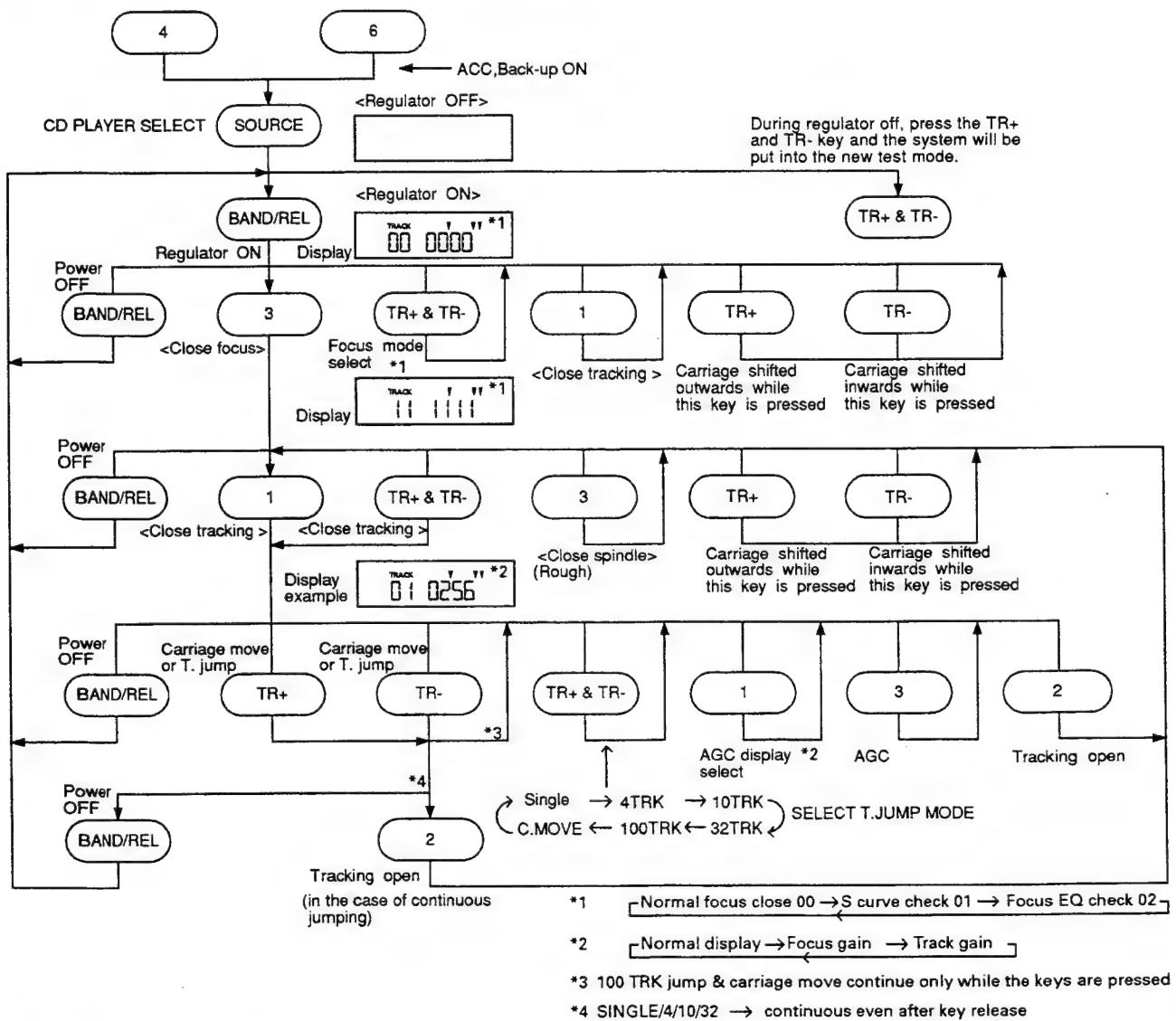
### 5.1 CD PLAYER SECTION

#### 1) Precautions

- This unit uses a single power supply (+5V) for the regulator. The signal reference potential, therefore, is connected to REFO(approx. 2.5V) instead of GND. If REFO and GND are connected to each other by mistake during adjustments, not only will it be impossible to measure the potential correctly, but the servo will malfunction and a severe shock will be applied to the pick-up. To avoid this, take special note of the following.  
Do not connect the negative probe of the measuring equipment to REFO and GND together. It is especially important not to connect the channel 1 negative probe of the oscilloscope to REFO with the channel 2 negative probe connected to GND.  
Since the frame of the measuring instrument is usually at the same potential as the negative probe, change the frame of the measuring instrument to floating status.  
If by accident REFO comes in contact with GND, immediately switch the regulator or power OFF.
- Always make sure the regulator is OFF when connecting and disconnecting the various filters and wiring required for measurements.
- Before proceeding to further adjustments and measurements after switching regulator ON, let the player run for about one minute to allow the circuits to stabilize.
- Since the protective systems in the unit's software are rendered inoperative in test mode, be very careful to avoid mechanical and /or electrical shocks to the system when making adjustment.
- Test mode starting procedure  
Switch ACC, back-up ON while pressing the **4** and **6** keys together.

- Test mode cancellation  
Switch ACC, back-up OFF.
- Disc detection during loading and eject operations is performed by means of a photo transistor in this unit. Consequently, if the inside of the unit is exposed to a strong light source when the outer casing is removed for repairs or adjustment, the following malfunctions may occur.
  - \* During PLAY, even if the eject button is pressed, the disc will not be ejected and the unit will remain in the PLAY mode.
  - \* The unit will not load a disc.  
When the unit malfunctions this way, either re-position the light source, move the unit or cover the photo transistor.
- When loading and unloading discs during adjustment procedures, always wait for the disc to be properly clamped or ejected before pressing another key. Otherwise, there is a risk of the actuator being destroyed.
- Turn power off when pressing the button **TR+** or the button **TR-** key for focus search in the test mode. (Or else lens may stick and the actuator may be damaged.)
- SINGLE/4TRK/10TRK/32TRK will continue to operate even after the key is released. Tracking is closed the moment C-MOVE is released.
- JUMP MODE resets to SINGLE as soon as power is switched off.

## ● Flow Chart



## ● Measuring Equipment and Jigs

Adjustment	Measuring equipment & jigs
1 Tracking Error Offset Adjustment 1	DC V Meter
2 Grating Check / Adjustment 1	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4), Two L.P.F., Clock Driver
3 Grating Adjustment 2	Oscilloscope, Grating Adjustment Filter (B.P.F.), mV Meter, ABEX TCD-784 (or SONY TYPE 4), Two L.P.F., Clock Driver
4 Tracking Balance Adjustment 1	Oscilloscope, Low-pass Filter, ABEX TCD-784 (or SONY TYPE 4)
5 Focus Bias Adjustment	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4)
6 RFO Offset Adjustment	Oscilloscope, ABEX TCD-784 (or SONY TYPE 4)
7 Tracking Error Offset Adjustment 2	DC V Meter
8 Tracking Balance Adjustment 2	Oscilloscope, Low-pass Filter, ABEX TCD-784 (or SONY TYPE 4)

### ● Adjustment Point

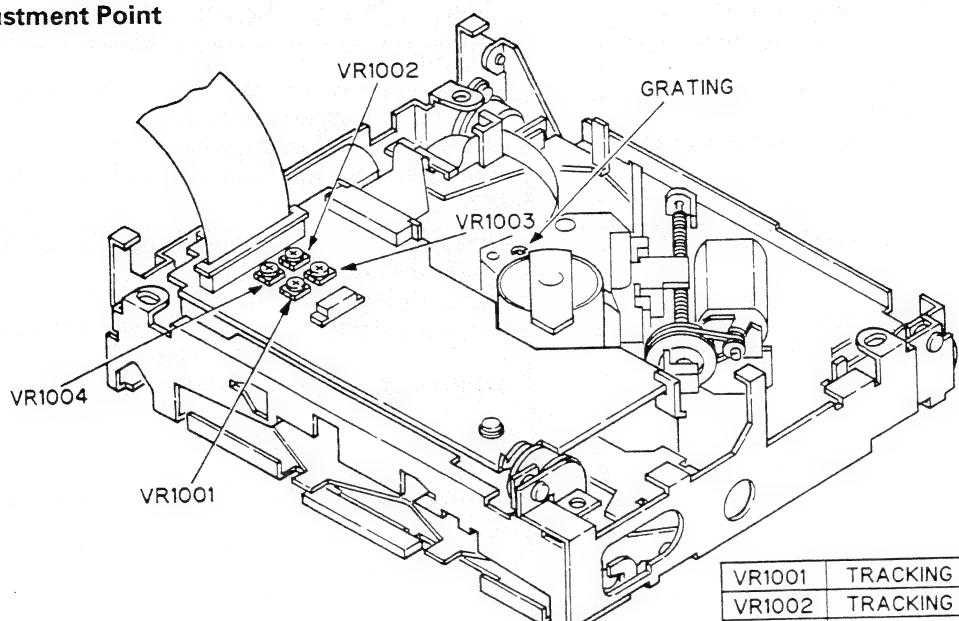


Fig.5

### ● Test Point

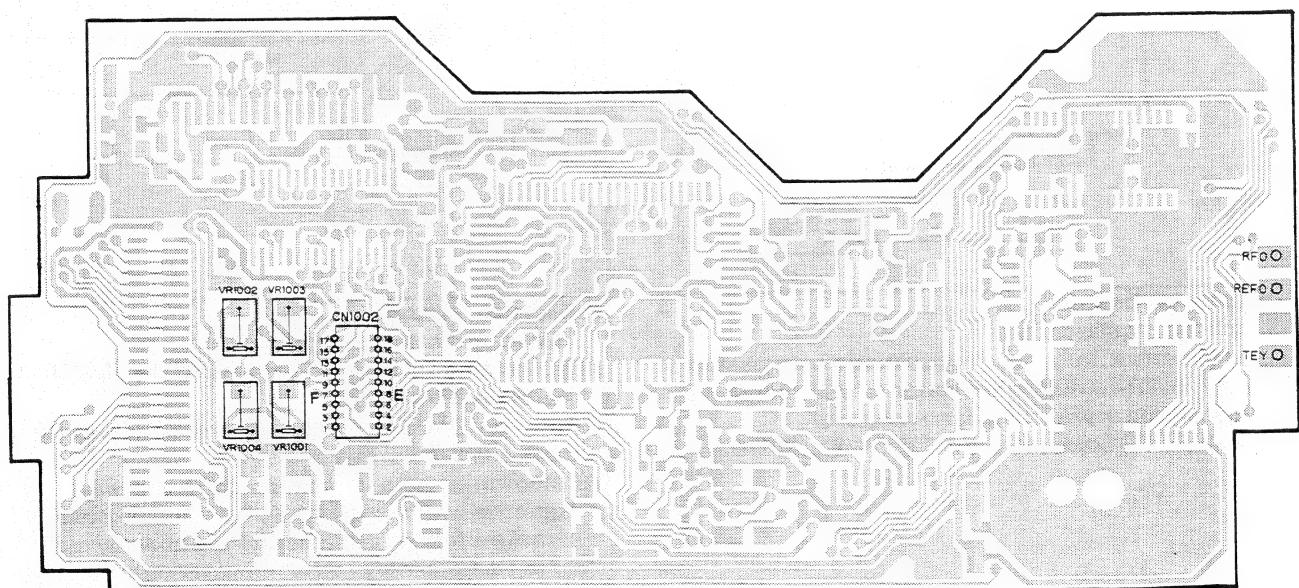
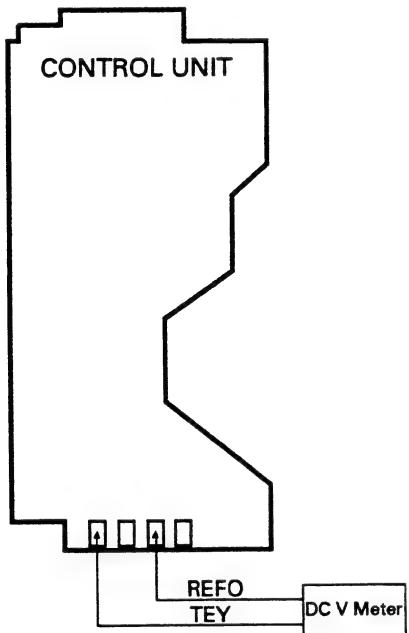


Fig.6

## 1 Tracking Error Offset Adjustment 1

- Purpose :**  
To adjust the offset of the tracking pre-amp to zero.
- Symptoms of Mal-adjustment :**  
Track search NG, carriage runaway, poor playability.

· Measuring Equipment / Jig	· DC V Meter
· Measuring Point	· TEY
· Test Disc , Mode	· TEST MODE
· Adjustment Point	· VR1001(TE OFFSET VR)



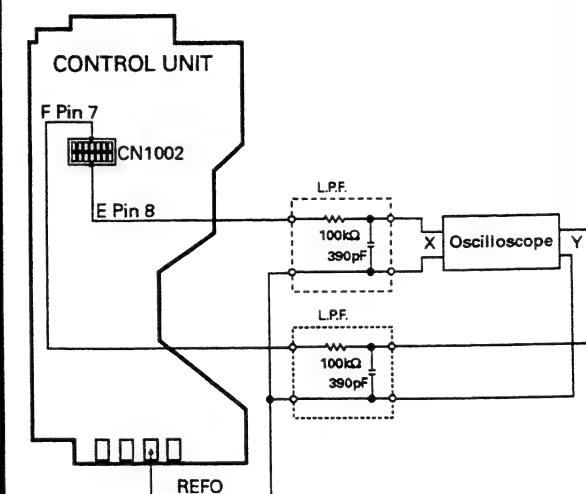
### Adjustment Procedure

1. Switch the regulator on.  
Select Focus EQ check in Focus mode by pressing key TR+ & TR-. And the indication 00 will change to 02. This mode makes the laser turned off.
2. Using VR1001, adjust TEY to  $0 \pm 25\text{mV}$  w.r.t. REFO.

## 2 Grating Check / Adjustment 1

- Purpose :**  
To check that the PU grating is correctly aligned after the PU unit has been replaced.
- Symptoms of Mal-adjustment :**  
Unable to play disc, track skip during search, search NG.

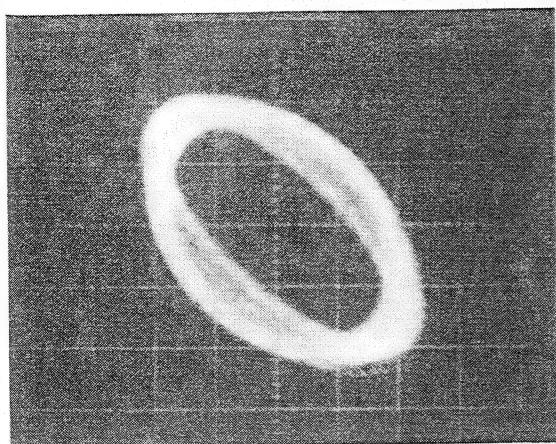
· Measuring Equipment / Jig	· Oscilloscope, Two L.P.F., Clock Driver
· Measuring Point	· E, F
· Test Disc , Mode	· ABEX TCD-784 (or SONY TYPE 4), TEST MODE
· Adjustment Point	· Grating hole



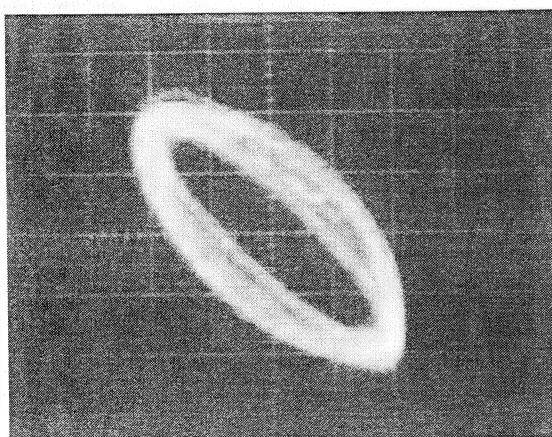
### Adjustment Procedure

1. Load disc and switch regulator on.
2. Position the PU unit in the center of the disc using the TR+ & TR- keys.
3. Press key 3 to close focus and press once more to close spindle.
4. Referring to the photographs given check that the grating is within  $\pm 45^\circ$ . If not, it should be possible to make a fine adjustment to the grating by slowly tuning the grating screw. If, however during the adjustment the lissajous figure is seen to "FLIP" then the null point must be found and the adjustment made from there (see next section).

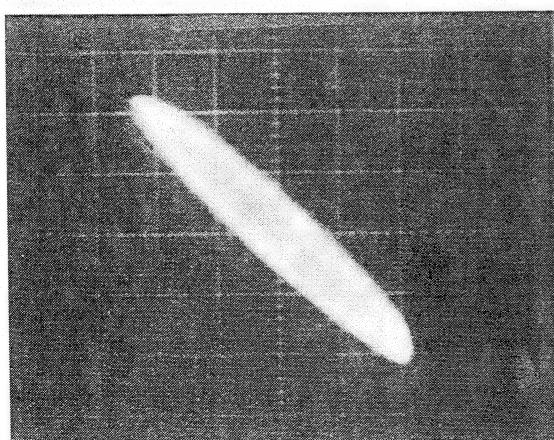
Lissajous figure (AC input)  
Horizontal axis E 10mV/div.  
Vertical axis F 10mV/div.



Waveform 1



Waveform 2



Waveform 3

### 3 Grating Adjustment 2

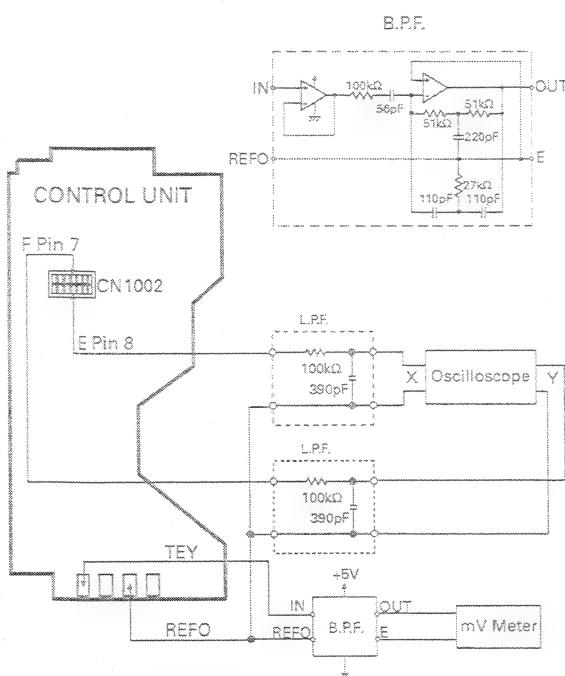
**Purpose :**

This needs to be done if the previous adjustment was unsuccessful.

**Symptoms of Mal-adjustment :**

Unable to play disc, track skipping, track search NG.

<b>Measuring Equipment / Jig</b>	Oscilloscope, Grating Adjustment filter (B.P.F.), mV Meter, Two L.P.F., Clock Driver
<b>Measuring Point</b>	TEY, E, F
<b>Test Disc , Mode</b>	ABEX TCD-784 (or SONY TYPE 4), TEST MODE
<b>Adjustment Point</b>	Grating hole

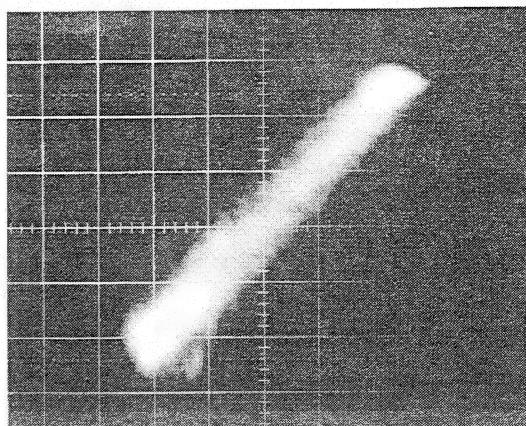


**Adjustment Procedure**

1. Load disc and switch regulator on.
2. Position the PU unit in the center of the disc using the TR+ & TR- keys.
3. Press key 3 to close focus and press once more to close spindle.
4. While monitoring the output of the B.P.F. connected to TEY, slowly turn the grating screw. The output voltage should pass through many minimums; search for the minimum which is clearly smaller than the rest - this is the "null point", where the E & F sub-beams are lined up with the tracks on the disc.
5. From this null point, turn the grating screw clockwise (as seen from the underside of the PU unit) until the lissajous waveform is a single line (or close as possible) as shown in the photograph.

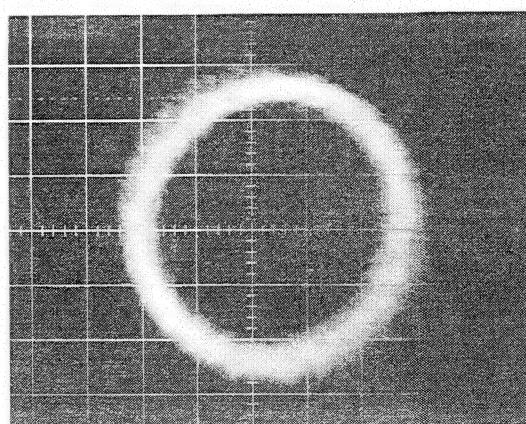
Null Point=180°

Lissajous figure (AC input)  
Horizontal axis E 10mV/div.  
Vertical axis F 10mV/div.



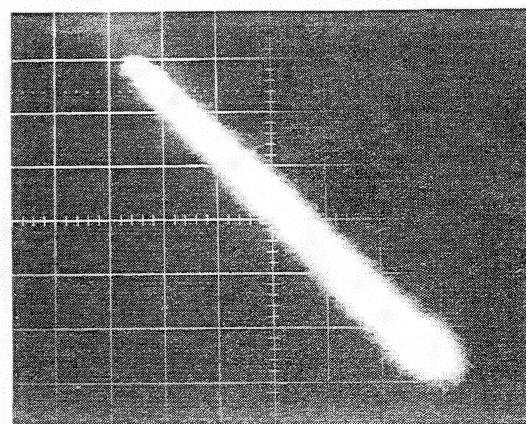
Waveform 4

"Rough" adjustment=90°



Waveform 5

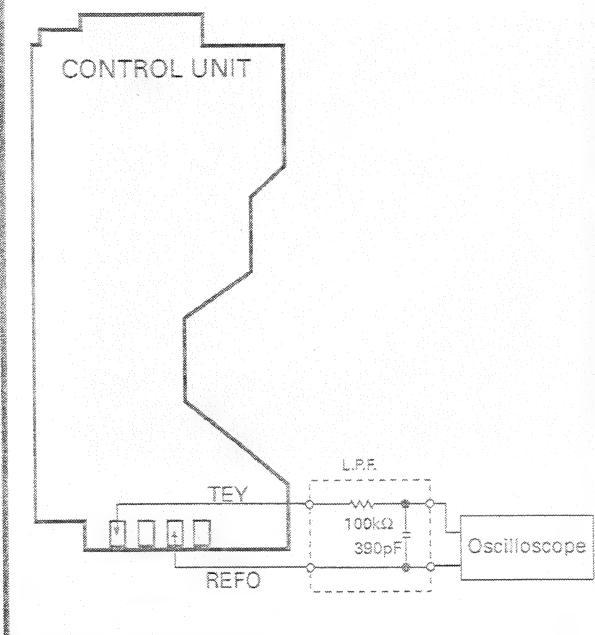
Final adjustment=0°



Waveform 6

#### 4 Tracking Balance Adjustment 1

• Purpose :	To equate the sensitivity of the F channel to that of the E channel.
• Symptoms of Mal-adjustment :	Track search NG, poor playability carriage runaway.
• Measuring Equipment / Jig	• Oscilloscope, L.P.F.
• Measuring Point	• TEY
• Test Disc , Mode	• ABEX TCD-784 (or SONY TYPE 4), TEST MODE
• Adjustment Point	• VR1002 (T.BAL VR)



##### Adjustment Procedure

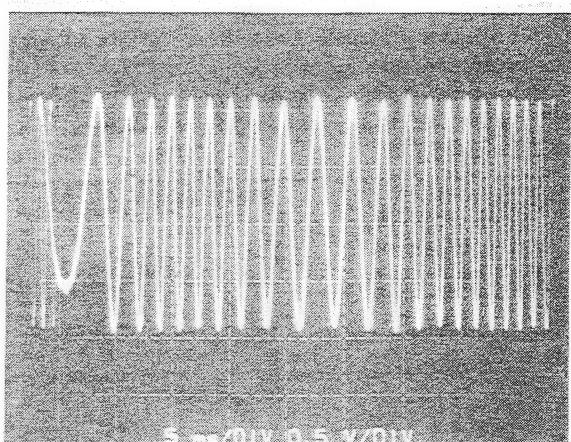
1. Load disc and switch the regulator on.
2. Position the PU unit in the center of the disc using the TR+ & TR- keys.
3. Close focus by pressing key 3.
4. Observing the TEY waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (see waveform 7-9).

##### Check

After adjustment the TEY waveform should have an amplitude of  $1.5 \pm 0.65$  Vpp.  
(ABEX TCD-784 or SONY TYPE 4)  
(Providing focus bias is OK)

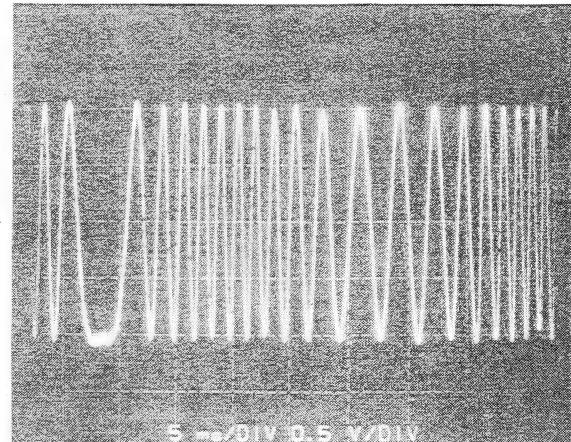
DC Mode  
0.5V/div.  
5ms/div.

+5% NG



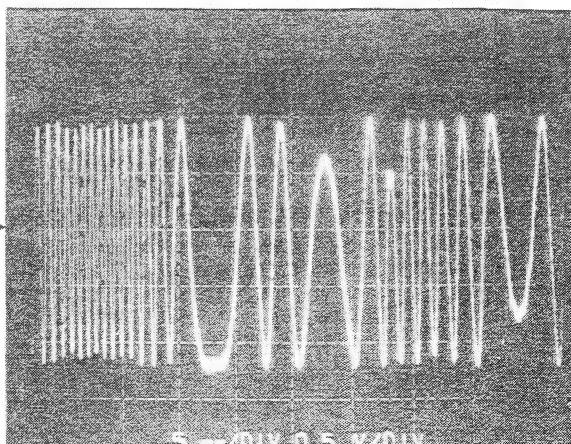
Waveform 7

±0% OK



Waveform 8

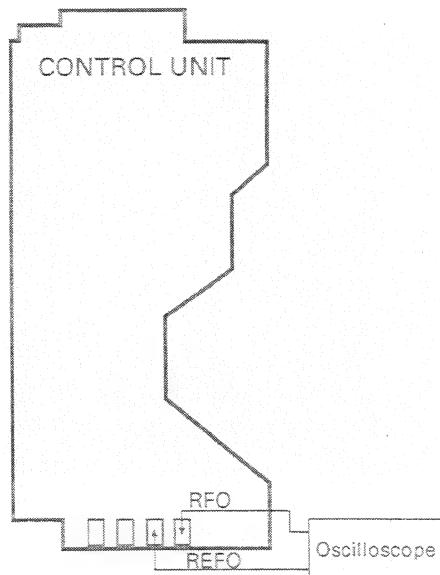
-5% NG



Waveform 9

## 5 Focus Bias Adjustment

• Purpose :	To adjust the focus servo reference so that the RF waveform is an optimum.
• Symptoms of Mal-adjustment :	Difficulty in closing focus, poor playability.
• Measuring Equipment / Jig	Oscilloscope
• Measuring Point	RFO
• Test Disc , Mode	• ABEX TCD-784 (or SONY TYPE 4), NORMAL MODE
• Adjustment Point	• VR1003 (FE BIAS VR)

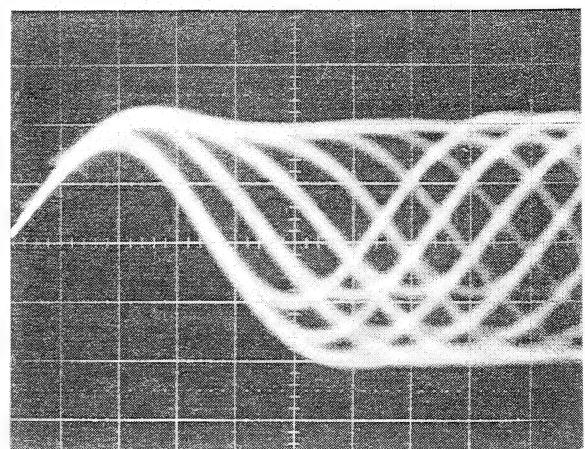


### Adjustment Procedure

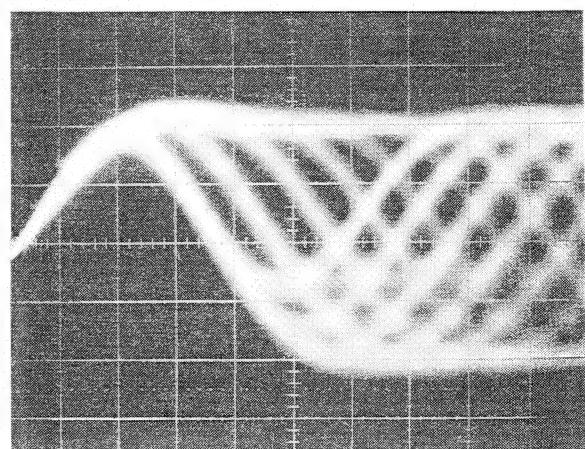
1. Play track number 18.
2. Adjust VR1003 so that the RFO waveform amplitude is a maximum and eye pattern is optimum.

### Check

After adjustment the RFO waveform should have an amplitude of  $1.7 \pm 0.65$  Vpp.  
(ABEX TCD-784 or SONY TYPE 4)



Waveform 10



AC Mode Before adjustment Waveform 11

## 6 RFO Offset Adjustment

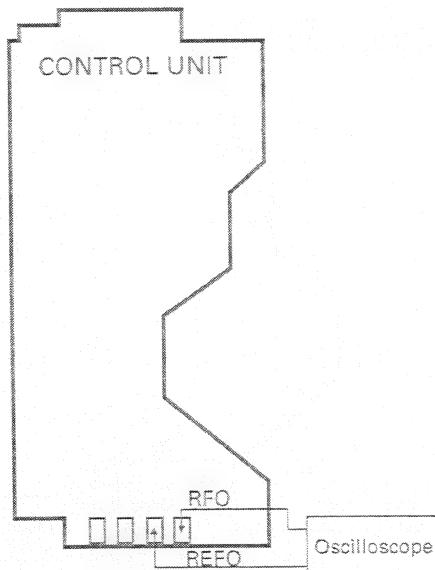
### Purpose

To adjust the RFO waveform offset to an optimum.

### Symptoms of Mal-adjustment

Difficulty in closing focus, poor playability.

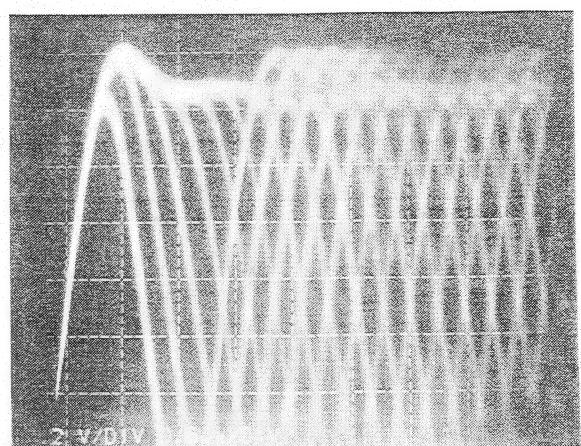
Measuring Equipment / Jig	Oscilloscope
Measuring Point	RFO
Test Disc , Mode	ABEX TCD-784 (or SONY TYPE 4), NORMAL MODE
Adjustment Point	VR1004 (RFO OFFSET VR)



### Adjustment Procedure

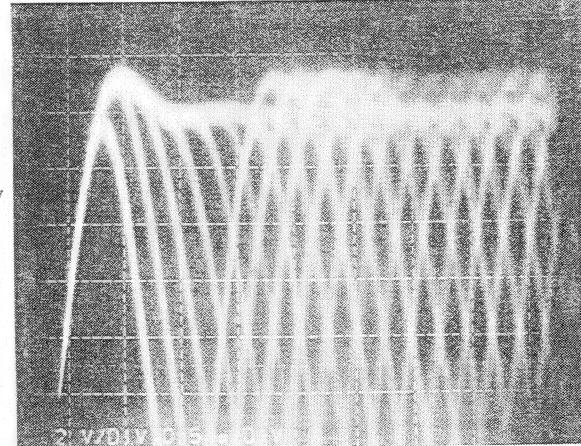
1. Play track number 18.
2. Adjust VR1004 so that the peak value of the upper envelope of the RFO waveform is at +1.1VDC w.r.t. REFO (See waveform 12-14).

+100mV NG



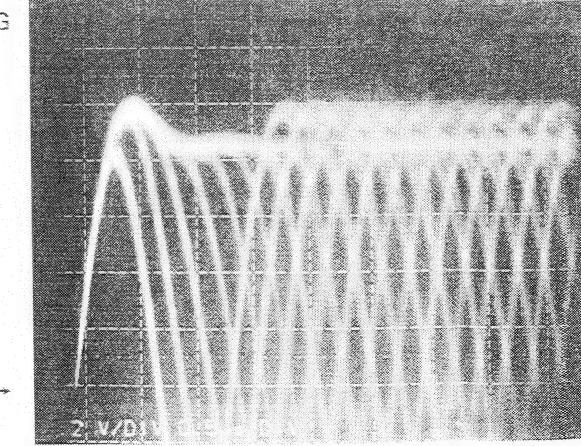
Waveform 12

OK



Waveform 13

-100mV NG



Waveform 14

DC Mode  
0.2V/div.  
0.5μs/div.

## 7 Tracking Error Offset Adjustment 2

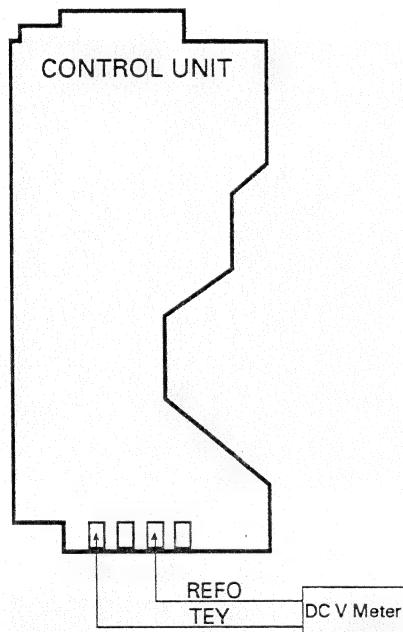
## · Purpose :

To check the offset of the tracking pre-amp is zero and adjust if necessary.

## · Symptoms of Mal-adjustment :

Track search NG, carriage runaway, poor playability.

· Measuring Equipment / Jig	· DC V Meter
· Measuring Point	· TEY
· Test Disc , Mode	· TEST MODE
· Adjustment Point	· VR1001(TE OFFSET VR)



## Adjustment Procedure

1. Switch the regulator on.

Select Focus EQ check in Focus mode by pressing key **TR+ & TR-**. And the indication 00 will change to 02. This mode makes the laser turned off.

2. Using VR1001, adjust TEY to  $0 \pm 25\text{mV}$  w.r.t. REFO.

## 8 Tracking Balance Adjustment 2

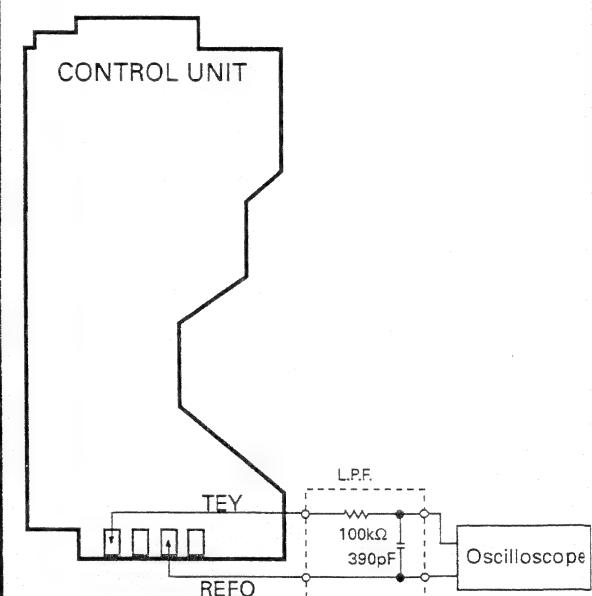
## · Purpose :

To equate the sensitivity of the F channel to that of the E channel. This needs only be done if the TE OFFSET volume was re-adjusted in the previous step.

## · Symptoms of Mal-adjustment :

Track search NG, poor playability, carriage runaway.

· Measuring Equipment / Jig	· Oscilloscope, L.P.F.
· Measuring Point	· TEY
· Test Disc , Mode	· ABEX TCD-784 (or SONY TYPE 4), TEST MODE
· Adjustment Point	· VR1002 (T.BAL VR)



## Adjustment Procedure

1. Load disc and switch the regulator on.
2. Position the PU unit in the center of the disc using the **TR+ & TR-** keys.
3. Close focus by pressing key **3**.
4. Observing the TEY waveform on the oscilloscope, adjust VR1002 until the positive and negative halves have the same amplitude (See waveform 7-9).

## Check

After adjustment the TEY waveform should have an amplitude of  $1.5 \pm 0.65 \text{ Vpp}$ .  
(ABEX TCD-784 or SONY TYPE 4)

## 5.2 TUNER SECTION

### ● Connection Diagram

#### NOTE:

Select C1 so that total capacity of 80pF is attained from the direction of the receiver jack.

Z: Output impedance of SSG.

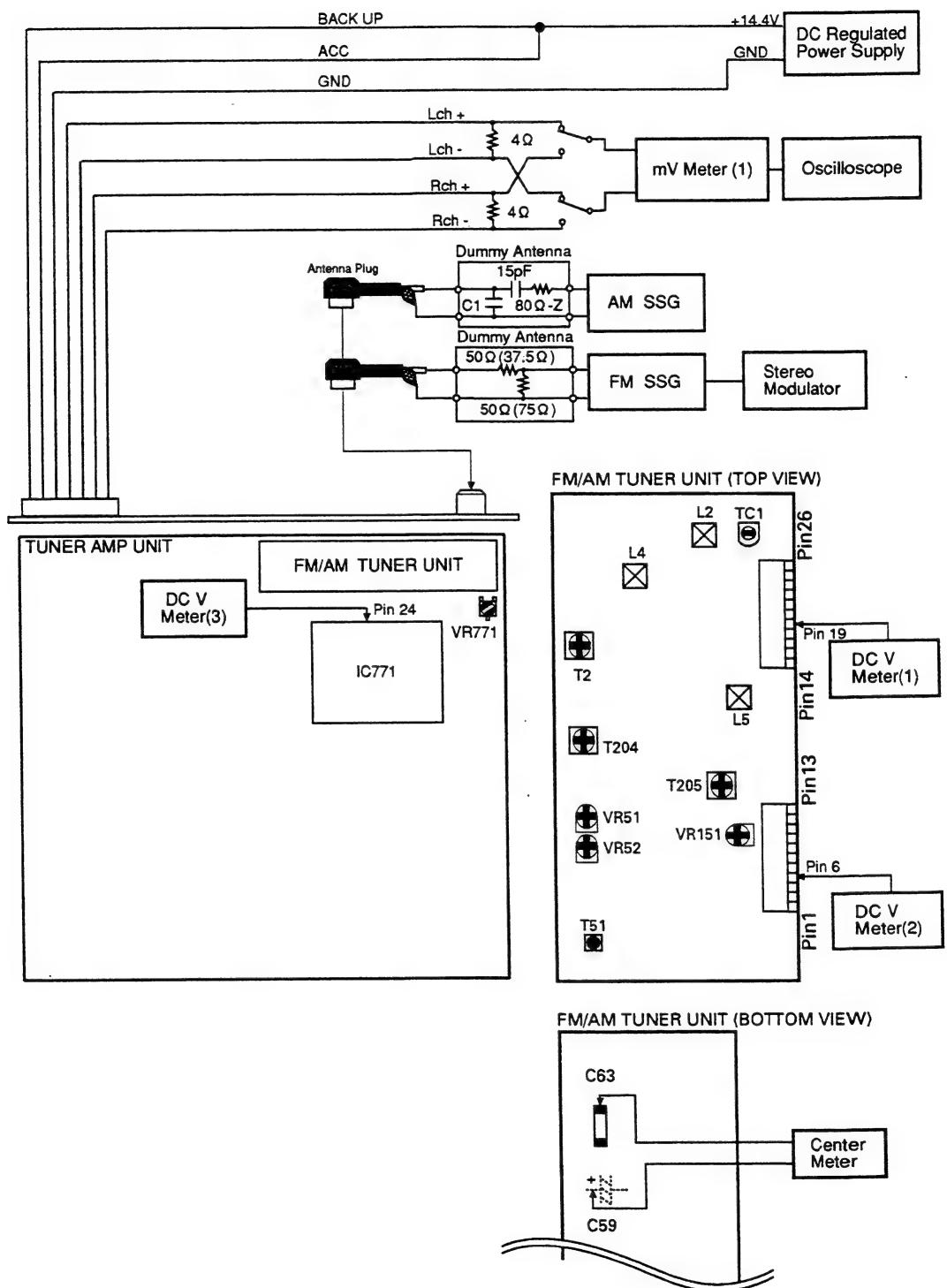


Fig.7

**AM ADJUSTMENT**

	No.	AM SSG(400Hz,30%)		Displayed Frequency(kHz)	Adjustment Point	Adjustment Method (Switch Position)
		Frequency(kHz)	Level(dB $\mu$ V)			
IF	1	999	20	999	T204,T205	mV Meter(1) : Maximum

**FM ADJUSTMENT**

Modulation M:MONO MOD., 400Hz 100%(75kHz Dev.)

S:STEREO MOD., 1kHz, L or R=100%(67.5kHz+7.5kHz Dev.)

NOTE: Before proceeding to further adjustments after switching power ON, let the tuner run for ten minutes to allow the circuits to stabilize.

	No.	FM SSG		Displayed Frequency(MHz)	Adjustment Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dBf)			
TUN Volt	1	108.0 M	65	108.0	L5	DC V Meter(1) : 6.5V $\pm$ 0.1V
IF	1	98.1 M	65	98.1	T51	Center Meter : 0
TRIMMER	1	.....	.....	.....	TC1	Initial setting(before measurement) of trimmer should be that of Fig.7.
ANT,RF	1	98.1 M	5	98.1	L2,L4	mV Meter(1) : Maximum
IMAGE	1	129.3 M	70—90	107.9	TC1	mV Meter(1) : Minimum
IIFT	1	98.1 M	10	98.1	T2	mV Meter(1) : Maximum (STEREO MODE)
Soft Mute	1	98.1 M	65	98.1	.....	mV Meter(1) : A (STEREO MODE)
	2	98.1 M	15	98.1	VR52	mV Meter(1) : A-3dB
ARC	1	98.1 S	40	98.1	VR151	mV Meter(1) : Separation 5dB
SD	1	98.1 S	22	98.1	VR51	DC V Meter(2) : Approx. 5V

**RDS SL ADJUSTMENT**

	No.	FM SSG		Displayed Frequency(MHz)	Adjustment Point	Adjustment Method (Switch Position)
		Frequency(MHz)	Level(dBf)			
	1	106.1 M	52	106.1	VR771	DC V Meter(3) : 2.25V $\pm$ 0.05V

## 6. ERROR NUMBERS AND NEW TEST MODE

### ● Error Number Indication

If the CD should fail to operate or if an error has taken place during operation the player will enter into the error mode, and the cause of the error will be numerically indicated.

This is aimed at assisting in analysis or repair.

## **(1) Basic Means of Display**

- With ERROR indicated in "MODE" on IP-BUS Display data, an error code is transmitted by the use of MIN and SEC. The MIN and SEC data will be identical.
- Examples of Display      ERROR-XX

## (2) Error Codes

Error Code	Classification	Description	Cause/Detail
10	ELECTRIC	Carriage home failure	Carriage doesn't move to or from the innermost position →Home switch failed and/or carriage immobile
11	ELECTRIC	Focus failure	Focus failed →Defects, disc upside-down, severe vibration
12	ELECTRIC	SETUP failure Subcode failure	Spindle failed to lock or subcode unreadable →Spindle defective, defect, severe vibration
14	ELECTRIC	Mirror failure	Unrecorded CD-R The disc is upside-down, defects, vibration
17	ELECTRIC	Set up failure	AGC protect failed →Defects, disc upside-down, severe vibration
30	ELECTRIC	Search time out	Failed to reach target address →Carriage/tracking defective and/or defects
A0	SYSTEM	Power failure	Power overvoltage or short circuit detected →Switching transistor defective and/or power abnormal

"defects" means scratches, dirt etc on the surface of the disc.

## ● New Test Mode(aging operation and setup analysis)

The single CD player plays in normal mode. After being set up, it will display FOK (focus), LOCK (spindle), subcode, sound skip, protection against a mechanical error or the like, occurrence of an error, cause and time of an expiry, if any, (and disk number).

During the setup, the CD software operation status (internal RAM and C-point) is displayed.

## (1) How to enter NEW TEST Mode

See the test mode flow chart Page 12.

## (2) Relations of keys between TEST and NEW TEST Modes

Keys	Test Mode		New Test Mode	
	Regulator OFF	Regulator ON	PLAY in progress	Error Occurred, Protection Activated
BAND/REL	Regulator ON	Regulator OFF	—	Time of occurrence / cause of error select
TR+	—	FWD-Kick	TRACK+ / FF	—
TR-	—	REV-Kick	TRACK- / REV	—
1	—	Tracking close	SCAN	—
2	—	Tracking open	REPEAT	—
3	—	Focus close	RANDOM	—
TR+ & TR-	To New Test Mode	Focus Mode Select	AUTO/MANU	—

Operations, such as EJECT, CD ON/OFF, etc. are performed normally.

## (3) Error Cause (Error Number) Code

Error Code	Classification	Mode	Description	Cause	Detail
40	ELECTRIC	PLAY	FOK=L	Put out of focus	Scratch, Stain, Vibration, Servo defect, etc...
41	ELECTRIC	PLAY	LOCK=L 150ms	Spindle unlock	
42	ELECTRIC	PLAY	Subcode unacceptable 500ms	Failed to read subcode	
43	ELECTRIC	PLAY	Sound skipped	Last address memory operated	

## (4) Indicating an Operation Status During Setup

Status No.	Description	Protection operation
01	Carriage home mode started	None
02	Carriage moving inwards	10-second time out, Home switch failed
03	Carriage moving outwards	10-second time out, Home switch failed
05	Carriage moving outwards	None
11	Setup started	None
12	Spindle turn/Focus search started	None
13	Waiting for focus closure (XSI=L)	Failure to close focus
10, 14	Waiting for focus closure (FOK=H)	Failure to close focus
15, 16, 17	Focus closed, Tracking open	Focus disrupted
18	During focus AGC Subcode waiting	Focus disrupted
19	During tracking AGC	Disrupted focus
20	Waiting for MIRR, LOCK or subcode read Carriage closed, SPINDLE=ADAPTIVE	Focus disrupted, MIRR NG, Failure to lock, Failed to read subcode

## 5) Example of Display.

·SET UP in progress

TNo.	Min	Sec
11	11	11

·Operation (PLAY, SEARCH, etc.) in progress perfectly identical with that in the normal mode.

·Protection/Error upon occurrence  
(a) Error number indicated

ERROR-xx

Select the display with the  
BAND/REL key.

(b) Track number and  
absolute time indicated

TNo.	Min	Sec
10	40	05

## 7. ELECTRICAL PARTS LIST

### NOTE:

- Parts whose parts numbers are omitted are subject to being not supplied.
- The part numbers shown below indicate chip components.

#### Chip Resistor

RS1/OS000J, RS1/OS000J

#### Chip Capacitor (except for CQS.....)

CKS....., CCS....., CSZS.....

=====Circuit Symbol & No. Part Name=====			Part No.	=====Circuit Symbol & No. Part Name=====			Part No.
Unit Number : CWE1360				R 9			RS1/16S153J
Unit Name : FM/AM Tuner Unit				R 10	32		RS1/16S682J
MISCELLANEOUS				R 11			RS1/16S474J
IC 1			PA2021B	R 13			RS1/16S104J
IC 2			PA2022B	R 15	103 217		RS1/16S563J
Q 1			3SK263	R 17	21 206		RS1/16S332J
Q 2			2SC2712	R 18			RS1/16S223J
Q 3			DTC124EU	R 22			RS1/16S560J
Q 51			DTC124TU	R 51			RS1/16S391J
Q 52			2SC4098	R 52			RS1/16S182J
Q 53			2SA1162	R 53			RS1/16S751J
Q 190			2SA1586	R 54			RS1/16S823J
Q 191 202			2SC2712	R 55	102 161 209 222		RS1/16S822J
Q 201			2SK932	R 56			RS1/16S272J
D 1			1SV251	R 60			RS1/16S21J
D 2 3 4			KV1410-F1	R 71			RS1/16S331J
D 5			MA151WK	R 72			RS1/16S681J
D 8 201			MA157-MR	R 73			RS1/16S224J
D 191			MA157-MR	R 74			
D 202			MA110-1A	R 101			
D 203			SVC253	R 104			RS1/16S822J
L 1	Inductor		LCTBR12K2125	R 153	159 239		RS1/16S103J
L 2 4			CTC1108	R 154			RS1/16S123J
L 3			CTC1105	R 155			RS1/16S822J
L 5			CTC1107	R 156			RS1/16S822J
L 51	Ferri-Inductor		LAU2R2K	R 157			RS1/16S562J
L 52			LAU150K	R 158			RS1/10S682J
L 201			LAU4R7K	R 160			RS1/16S273J
L 203	Inductor	Inductor 1mH	CTC1105	R 190			RS1/16S473J
L 204		Ferri-Inductor	CTC1107	R 191	207		RS1/16S225J
L 206		Inductor	LAU151K	R 192			RS1/16S102J
L 207		Ferri-Inductor	LAU3R3K	R 193			RS1/16S222J
T 2		Coil	LAU330K	R 194			RS1/16S222J
T 51	Coil	Inductor 1mH	CTE1026	R 203			RS1/16S221J
T 204		Coil	CTE1074	R 204	213		RS1/16S224J
T 205		Coil	CTE1075	R 205			RS1/16S225J
TC 1		Coil	CCL1038	R 208			RS1/16S333J
CF 51 52 201			CTF1292	R 214	218		RS1/16S330J
CF 202			CTF1292	R 215	224		RS1/16S152J
X 151			CTF1300	R 216			
X 201	Crystal Resonator		CSS1308	R 220			RS1/16S100J
VR 51		Semi-fixed 47kΩ (B)	CSS1111	R 221			RS1/16S273J
VR 52		Semi-fixed 68kΩ (B)	CCP1210				
VR 151	Capacitor with Discharge Gap	Semi-fixed 10kΩ (B)	CCP1206	C 1			CCSQCH220J50
AR 1			DSP-201M	C 2	11 19 29 51 52 62 63		CKSRYB103K50
RESISTORS				C 3			CCSRCH470J50
R 1 3 16 20				C 4			CCSRH270J50
R 2			RS1/16S223J	C 6			CCSRRH040C50
R 4 14			RS1/16S331J	C 8			CKSRYB102K50
R 6			RS1/16S563J	C 9			CCSRCH470J50
R 8			RS1/16S123J	C 10			CCSRRH100D50
			RS1/16S271J	C 12 13			CCSRCH050D50
				C 14 20 21 151 227 228			CKSRYB103K50

=====Circuit Symbol & No. Part Name=====						Part No.	=====Circuit Symbol & No. Part Name=====						Part No.
C 15 55 58 101 161						CKSQYB104K16							
C 16						CCSRCH020C50							
C 17						CCSRRH100D50							
C 18						CCSRRH090D50							
C 23 56 104 162						CEA010M50LL							
C 24 106 213 236						CKSRYB223K25							
C 26 28 212						CEA330M10LL							
C 27						CKSRYB103K50							
C 31 73						CKSRYB333K16							
C 32 103 105 206						CKSRYB222K50							
C 34						CKSRYB682K50							
C 53 54						CCSRCH270J50							
C 57 64 66						CCSRCH101J50							
C 59						CEAR47M50LL							
C 61						CEAR22M50LL							
C 72						CKSRYB102K50							
C 164 209 210 215 220 223 225 235 239						CKSRYB103K50							
C 102 154 156 163 203 219 238						CKSQYB473K16							
C 152 153						CKSRYB223K25							
C 155						CEAR68M50LL							
C 158						CEA100M16LL							
C 159						CCSRCH271J50							
C 160						CKSYB105K16							
C 190						CKSRYB103K50							
C 191						CEA150M10LS							
C 201						CKSRYB222K50							
C 204						CCSRCH151J50							
C 205 221						CCSRCH680J50							
C 207						CEA470M6R3LL							
C 208						CCSRCH330J50							
C 211						CKSYB105K16							
C 214 230						CKSRYB472K50							
C 216						CCSRCH100D50							
C 217						CCSRCH221J50							
C 218						CEA4R7M35LL							
C 222						CCSRCH150J50							
C 224						CCSRUJ181J50							
C 226						CEA4R7M35LL							
C 229						CEAR68M50LL							
C 232						CCSRTH180J50							
C 233						CKSRYB332K50							
C 234						CEA220M6R3LL							
C 240						CKSRYB103K50							
Unit Number : CWX1796							CAPACITORS						
Unit Name : Control Unit							C 1001 1008 1010 1011 1303						CKSRYB102K50
MISCELLANEOUS							C 1002 1609 1706						CEV101M6R3
IC 1001							C 1003						CKSQYB104K16
IC 1201							C 1004						CEV470M6R3
IC 1301							C 1005						CCSRCH101J50
IC 1302							C 1006						CKSRYB561K50
IC 1303							C 1007 1704						CKSYB334K16
IC 1601							C 1009						CCSRCH181J50
IC 1602							C 1013						CKSRYB103K50
IC 1701							C 1014						CCSRCH220J50
Q 1001							C 1015 1016 1017 1018 1201 1202						CKSYF105Z16
Q 1601 1602							C 1021						CKSYB104K16
Q 1603							C 1022						CKSRYB332K50
D 1601							C 1023						CKSRYB561K50
D 1701 1702 1703 1704							C 1203						CKSRYB471K50
D 1801 1802	Chip LED						C 1301 1302						CKSRYF683Z25
L 1601	Inductor						C 1304						CKSRYB152K50
X 1601	Crystal Resonator						C 1305						CKSRBY271K50
S 1801 1802	Switch(Home,Clamp)						C 1307 1310 1605 1608						CKSRYB103K50
VR1001	Semi-fixed 2.2kΩ (B)						C 1308						CKSRYF103Z50
VR1002	Semi-fixed 22kΩ (B)						C 1309						CEV470M16
VR1003 1004	Semi-fixed 47kΩ (B)						C 1601						CCSRCH151J50
							C 1602						CCSRCH100D50
							C 1603 1604 1705						CKSRYB224K16
							C 1606 1607						CCSRCH090D50
							C 1612						CEV220M6R3
							C 1613 1614						CEV4R7M35
							C 1701 1702						CCSRCH100D50
							C 1703						CEV220M16

=====Circuit Symbol & No. Part Name=====		Part No.
Unit Number : CWX1817		
Unit Name : Tuner Amp Unit		
MISCELLANEOUS		
IC 471	NJM4558L	
IC 481	LC7538JMHS	
IC 482 483	NJM4558MD	
IC 501	LC72140M	
IC 551	PA3029B	
IC 601	PD4576B	
IC 602	PD4402B	
IC 603	PDH004A	
IC 771	CWV1051	
IC 961	PAJ001A	
IC 971	PA2023A	
Q 451 452 502 504 508 771 773	2SC2712	
Q 453 454	DTC343TK	
Q 455 456	DTC114TK	
Q 457	2SA1162	
Q 501	2SC3295	
Q 503	2SC3098	
Q 505 509	2SK208	
Q 510 959	DTA114TS	
Q 551 601 604 606 957 983	UN2211	
Q 602 982	UN2111	
Q 603 607 956	2SB1238	
Q 605 958	2SA1048	
Q 608	DTC114ES	
Q 681	2SC3421	
Q 691	2SC2458	
Q 772	DTC124EK	
Q 981	2SD2396	
D 501 971	MA151WK-MT	
D 504 505	MA3027	
D 551 552 553 554 555 556 557 558 957 961	ERA15-02	
D 601	MA151WK-MT	
D 602	MTZ4R7JA	
D 603 604 611 612 613 614 615 616 683 684	1SS133	
D 681	HZS9LB2	
D 682	HZS6LC2	
D 685 686 771 953 958 959 972 973	1SS133	
D 772	MTZ4R7B	
D 951	ERC05-10B	
D 956	ERA15-10	
D 962	MA719	
D 981	RB100AVH	
D 984	HZS9LC3	
L 501	Ferri-Inductor	
L 502 601 602 701	Inductor	
L 603	LPSQ2R2K	
TH 601	Inductor	
X 501	Thermistor	
X 601	Crystal Resonator	
X 602	Crystal Resonator	
	Ceramic Resonator	
CSS1011	CSS1023	
CSS1029	CSS1029	
VR 771	Semi-fixed 4.7kΩ (B)	
BZ 601	VRMB6VS472	
	CPV1011	
	CWE1360	
	Connector Unit	
	CWX1879	
RESISTORS		
R 451 452	RS1/10S272J	
R 455 456 457 458 463 464 529 533 536 538	RS1/10S102J	
R 459 460 475 476 505 952 956	RS1/10S223J	
R 467 468 489 491 493 495 507 531 665 697	RS1/10S103J	
R 471 472 782	RS1/10S332J	

=====Circuit Symbol & No. Part Name=====		Part No.
R 473 474		RD1/4PS153JL
R 477 478		RD1/4PS331JL
R 485 486 487 566 567 568 569 633 966		RD1/4PS472JL
R 488 490 492 494 698		RS1/10S682J
R 503 508 509 512 516 530 627 629 630 632		RS1/10S472J
R 504 511 513 534 535 601 603 641 680		RS1/10S222J
R 506 526 696		RS1/10S221J
R 510		RS1/10S123J
R 514 515 521 522 602 604 618 619 621 671		RS1/10S473J
R 517 518 519 520 622 678		RD1/4PS222JL
R 523		RS1/10S563J
R 524 784		RS1/10S101J
R 525		RS1/10S821J
R 527		RS1/10S221J
R 528		RS1/10S680J
R 532 781		RS1/10S152J
R 539 540 541 547 605 606 609 610 616 651		RS1/10S102J
R 542		RS1/10S822J
R 543 614		RS1/10S330J
R 551 552 553 554		RS1/10S472J
R 555 556		RS1/10S2R2J
R 557 607 959 965		RD1/4PS102JL
R 558 559 560 561 562 563 564 565		RD1/4PS2R2JL
R 570		RD1/4PS122JL
R 571		RS1/10S332J
R 572		RS1/10S122J
R 617		RD1/4PS473JL
R 620		RS1/10S683J
R 623 625 971		RS1/10S104J
R 624		RD1/4PS222JL
R 626		RS1/10S183J
R 628 958		RD1/4PS272JL
R 634 636 637 638 645 646 647 684 957 968		RS1/10S472J
R 635		RD1/4PS100JL
R 639		RD1/4PS103JL
R 640 771		RS1/10S471J
R 652 657 658 659 660 662 663 664 695 780		RS1/10S102J
R 653 654 655 656		RS1/10S681J
R 666 983		RS1/10S393J
R 667		RS1/10S155J
R 668 669 670 674 675 676 685 981		RD1/4PS471JL
R 672 673 677 679 686 687 688 689 693 694		RS1/10S473J
R 681 690		RD1/4PS4R7JL
R 692		RS1/10S0R0J
R 699		RS1/10S0R0J
R 772 773 774 775 776 777 778 967 975 984		RS1/10S473J
R 783		RS1/10S103J
R 951		RS1/10S513J
R 960		RD1/4PS3R3JL
R 961		RD1/4PS823JL
R 962		RS1/10S363J
R 963		RS1/10S684J
R 964		RS1/10S474J
R 969		RS1/10S273J
R 972		RS1/10S102J
R 973		RS1/10S472J
R 974 976		RS1/10S103J
R 977		RS1/10S105J
R 982		RD1/4PS221JL
CAPACITORS		
C 451 452 516 575		CEA4R7M35LL
C 471 472 481 482 483 484 485 486 491 492		CEA100M16LL
C 473 474		CCS0CH560J50
C 475 951 963	1000μF/16V	CCH1149
C 487 488		CKSYB224K25

<b>====Circuit Symbol &amp; No. Part Name=====</b>		<b>Part No.</b>	<b>====Circuit Symbol &amp; No. Part Name=====</b>		<b>Part No.</b>
C 489 490		CKSQYB272K50	C 964		CEA330M10LL
C 493 494 506 507 610 958		CKSQYB223K50	C 965		CEA220M6R3LL
C 495 496		CKSQYB562K50	C 966		CEA2R2M50LL
C 497 498 499 500 612 613		CCSQCH330J50	C 972		CEA470M10LL
C 501 505 509 512 517 701		CCSQCH101J50	C 973		CEA101M10LL
C 502 513 602 603 607 622 628 682 957 982	4.7μF/16V	CKSQYB473K50	C 974		CEAS221M10
C 504 510 514 523 524 772 952 954		CKSQYB103K50	C 975		CEAS331M10
C 511		CKSQYB681K50	C 981		CEAS331M16
C 515		CFTNA474J50	C 983		CKSQYB102K50
C 518 519		CCSQCH120J50	Unit Number : CWX1879		
C 520		CCH1005	Unit Name : Connector Unit		
C 551 552 554 555 614 615 616 617 618 619	4.7μF/16V	CKSQYB102K50	L 951	Coil	CTH1113
C 553 567 568 569 570 773		CEA100M16LL	FU 901	Fuse 10A	CEK1136
C 556	3300μF/16V	CCH1150	C 991		CEAS471M16
C 557 558 601 609 627		CKSQYB104K25	C 992 993		CKDVB222K50
C 559 560 561 562 563 564 565 566		CFTNA104J50	Unit Number :		
C 604 605		CCSQCH150J50	Unit Name : Detector P.C.Board		
C 608 681 953 956 971		CEA010M50LL	P 1 2	Photo Transistor	PT4800
C 611		CKSYF105Z25	Miscellaneous Parts List		
C 620		CKSQYB472K50	M 1	PU Unit	CGY1031
C 621	0.47μF/5.5V	CCL1014	M 2	Motor Unit (Spindle)	CXA5703
C 691		CEA0R1M50LL	M 3	Motor Unit (Carriage)	CXA7150
C 692		CASA6R8M6R3		Motor Unit (Loading)	CXA6456
C 771		CEAR47M50LL			
C 962		CEAR22M50LL			

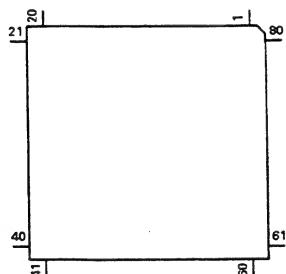
## ● ICs

## ● Pin Functions (PD4576B)

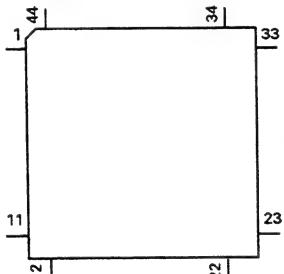
Pin No.	Pin Name	I/O	I/O Format	Function and Operation
1	ANTSENS	I		Anti-theft sense input
2	RDSRST	O	C	Reset output for RDS IC
3	RDSSEL	O	C	Select output for RDS IC
4	AVSS			A/D GND
5	RDSEN	O	C	Enable output for RDS IC
6	RDSRDY	I		Ready input from RDS IC
7	AVREF1	I		A/D converter reference voltage
8	KYDT	I		Key data input
9	DPDT	O	C	Display data output
10	RST	O	C	LSI reset output
11	RDSDI	I		Serial data input for RDS IC
12	RDSDO	O	C	Serial data output for RDS IC
13	RDSCK	O	C	Serial clock output for RDS IC
14	A0	O	C	LSI data control signal
15	STB	O	C	LSI Strobe output
16	XSI	I		LSI data input
17	XSO	O	C	LSI data output
18	XSCK	O	C	LSI clock output
19	CONT	O	C	Servo driver power supply control
20	LOAD	O	C	Loading motor LOAD control
21	EJET	O	C	Loading motor EJECT control
22	POWER	O	C	CD +5V control
23	NC			Not used
24	CDMUTE	O	C	CD mute output
25	TMUTE	O	C	Tuner mute output
26	VDCNT	O	C	VD control output
27	FOK	I	C	FOK signal input
28	MIRR	I	C	Mirror detector input
29	LOCK	I	C	Spindle lock detector input
30	CLAMP	I		Disc clamp sense input
31	HOME	I	C	Home position detector input
32	ILMIN	I		Illumination input
33	VSS			GND
34	VDSENS	I	C	VD over voltage sense input
35	VMC			Not used
36	NC			Not used
37	ADENA	O	C	AVREF enable output
38	NC			Not used
39	CDPW	O	N	CD power control
40	VDT	O	C	Data output for electronic volume
41	SYSPW	O	C	System power supply control output
42	BLGT	O	C	LCD back light control output
43	VLCDPW	O	C	Power supply control output for LCD driver
44	SWVDD	O	C	Key board unit power supply control output
45	PEE	O	C	Beep tone output
46	PEE2	O	C	Beep tone output for anti-theft
47	VST	O	C	Strobe pulse output for electronic volume
48	VCK	O	C	Clock output for electronic volume
49	PCL	O	C	Clock adjustment output
50	FM/AM	O	C	FM/AM power select output
51	MONO	O	C	Forced mono output
52	NC			Not used
53	SIMUKE2	I		Model select input
54	ES/EW	I		Model select input
55	TEL	I		TEL mute input
56	MUTE	O	C	Mute output

Pin No.	Pin Name	I/O	I/O Format	Function and Operation
57	EDI	I		Serial data input from EEPROM
58	ECE	O	C	Chip enable output for EEPROM
59	SD	I		Tuner SD input
60	RESET	I		Reset input
61	REMIN	I		Remote control signal input
62	BSENS	I		Back up power sense input
63	ASENS	I		ACC power sense input
64	ELDI	I		Data input from external IC
65	ELXDT	O	C	Data output for external IC
66	ELXCK	O	C	Serial clock output for external IC
67	PCE	O	C	Chip enable output for PLL IC
68	VDD			Power supply
69	X2			Crystal oscillator connection pin
70	X1			Crystal oscillator connection pin
71	IC			Connect to GND
72	XT2			Not used
73	TESTIN	I		Test program mode input
74	AVDD			Positive power supply terminal for A/D converter
75	AVREF0	I		A/D converter reference voltage
76	SL	I		Signal level input from tuner
77	TEMP	I		Temperature detector
78	DINC	I		Disc insert sense input
79	EJTD	I		Disc eject position sense input
80	DSENS	I		Grille detach sense

\*PD4576B



\*PD4402B



I/O Format	Meaning
C	CMOS
N	N channel open drain

IC's marked by\* are MOS type.

Be careful in handling them because they are very liable to be damaged by electrostatic induction.

### ● Pin Functions (PD4402B)

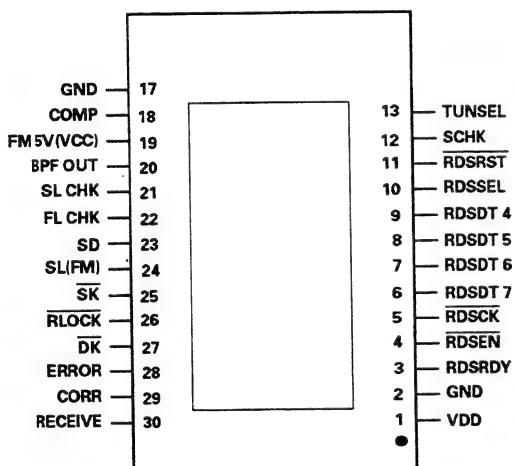
Pin No.	Pin Name	I/O	I/O Format	Function and Operation
1-3	IN1,IN0,IN2	I		Remote control key return input
4-7	NC			Not used
8	REMOUT	O	C	Key data output
9-16	NC			Not used
17	VSS			GND
18-23	NC			Not used
24	X2			Crystal oscillator connection pin
25	X1			Crystal oscillator connection pin
26	VDD			Power supply
27-29	NC			Not used
30	VSS			GND
31	RST	I		Reset input
32-41	NC			Not used
42	L5	O	N	Remote control key strobe output
43,44	L1,L0	O	N	Remote control key strobe output

I/O Format	Meaning
C	CMOS
N	N channel open drain

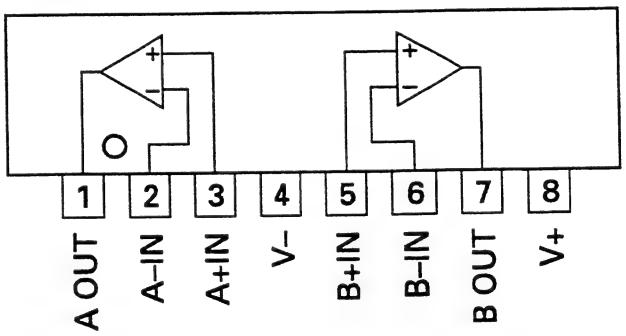
## ● Pin Functions (CWV1051)

Pin No.	Pin Name	I/O	Function and Operation
1	VDD		Power supply for RDS controller
2	GND		GND
3	RDSRDY	I	Ready input from system control IC
4	RDSEN	O	Enable output for system control IC
5	RDSCK	I	Serial clock input from system control IC
6-9	RDSDT 7-4	I/O	Data input/output to system control IC
10	RDSSEL	I	Select input from system control IC
11	RDSRST	I	Reset input from system control IC
12	SCHK	I	Unit check input
13	TUNSEL	I	FM/AM tuner unit select input
14-16	VACANT		
17	GND		GND
18	COMP	I	FM composite signal input
19	FM 5V(VCC)		Power supply decoder
20	BPF OUT	O	Band pass filter test output
21	SL CHK	O	SL check output
22	FL CHK	O	FL check output
23	SD	I	RDS decode control input
24	SL(FM)	I	Signal level input from tuner
25	SK	I	SK signal detect input
26	RLOCK	O	RDS test output
27	DK	O	DK signal detect output
28	ERROR	O	Disapprove of error correction output
29	CORR	O	Error output
30	RECEIVE	O	RDS synchronizing test output

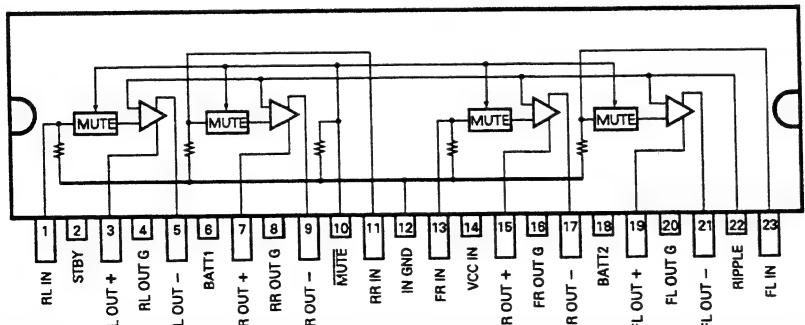
CWV1051



NJM4558L



PA3029B



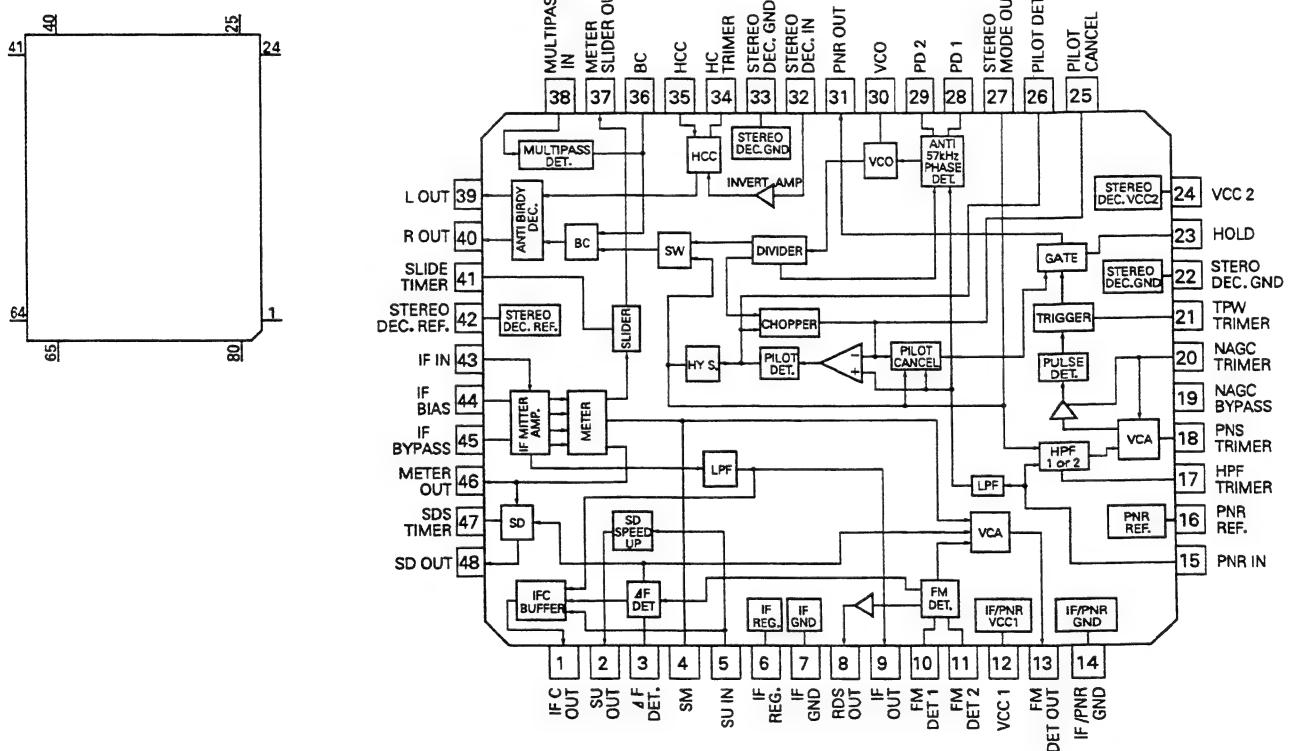
## ● Pin Functions(UPD63700GF1)

Pin No.	Pin Name	I/O	Function and Operation
1	D.GND		Logic circuit GND
2	RFOK	O	RFOK detection signal output terminal
3	MIRR	O	MIRR detection signal output terminal
4	TBC	I	Tracking filter bank switching terminal
5	HOLD	I	Hold control signal input terminal
6	D.VDD		VDD for logic circuit
7	RST	I	System reset
8	AO	I	Control signal distinguishing data from microcomputer
9	STB	I	Signal latching serial data inside LSI
10	SCK	I	Clock input terminal for serial data input and output
11	SO	O	Serial data and status signal output
12	SI	I	Serial data input
13	TM2	I	Double speed playback control terminal
14	D.GND		Logic circuit GND
15	TEST	I	Test terminal
16	STBY	I	Stand-by input terminal
17	CTLV	I	Control terminal for clock generation VCO used by digital PLL in double speed playback mode
18	POUT	O	Output terminal for phase comparison between EFM signal and bit clock
19	D.GND		Logic circuit GND
20	VCO	I	Inverter input
21	VCO	O	Inverter output
22	D.VDD		VDD for logic circuit
23	PLCK	O	Bit clock monitor terminal
24	LOCK	O	"H" when synchronization signal and frame counter output coincide at EFM demodulator
25	WFCK	O	Signal issuing one-frame period by bit clock dividing signal
26	RFCK	O	Oscillation clock divider signal, output pin for signal giving 1-frame sync
27	C4M	O	Output terminal for signal having four the frequency of LRCK
28	C16M	O	Oscillation clock output terminal
29	D.GND		Logic circuit GND
30	XTAL	I	Oscillation continuation terminal
31	XTAL	O	Oscillation continuation terminal
32	D.VDD		VDD for logic circuit
33	SCKO	O	Clock output terminal for audio serial data
34	LRCK	O	Signal distinguishing between left and right channel DOUT terminal output
35	DOUT	O	Serial audio data output terminal
36	TX	O	Digital audio interface data output terminal
37	FLAG	O	Flag signal indicating that the current audio data output of incorrectable data
38	EMPH	O	Emphasis information output
39	WDCK	O	Output terminal for signal having double the frequency of LRCK
40	C2D3	O	Output terminal indicating C2 error correction status
41	SFSY	O	Signal indicating subcode one-frame synchronization
42	SBSY	O	Signal indicating head of subcode block
43	SBSO	O	Subcode data output terminal
44	SBCK	I	Subcode data read clock input terminal
45	D.GND		Logic circuit GND
46,47	C1D1,C1D2	O	Output terminal indicating C1 error correction status
48,49	C2D1,C2D2	O	Output terminal indicating C2 error correction status
50	T4	I	Selects between focus and tracking modulation mode
51	T5	I	Selects motor PWM output mode
52	T6	I	Sets focus PWM output mode
53	T7	I	Sets tracking PWM output mode
54	D.VDD		VDD for logic circuit
55	MRD	O	PWM negative output terminal for the spindle loop filter
56	MFD	O	PWM positive output terminal for the spindle loop filter
57	SRD	O	PWM negative output terminal for the thread loop filter
58	SFD	O	PWM positive output terminal for the thread loop filter

Pin No.	Pin Name	I/O	Function and Operation
59	D.GND		Logic circuit GND
60	TRD	O	PWM negative output terminal for the tracking loop filter
61	TFD	O	PWM positive output terminal for the tracking loop filter
62	FRD	O	PWM negative output terminal for the focus loop filter
63	FFD	O	PWM positive output terminal for the focus loop filter
64	D.VDD		VDD for logic circuit
65	OUTSEL	I	Sets PWM output mode for the motor system
66	TEC1	I	Tracking error input terminal
67	TEC0	I	Tracking error input terminal
68	A.VDD		VDD for analog circuit
69,70	VR2,VR1	I	A/D converter input
71	TE	I	Tracking error input terminal
72	FE	I	Focus error input terminal
73	RFB	I	RFB signal input terminal
74	RFP	I	RFP signal input terminal
75	A.GND		Analog circuit GND
76	REFOUT	O	A/D converter midpoint voltage output terminal inside LSI
77	RFI	I	RF signal input terminal for EFM comparator
78	ASI	I	Level comparing input for RF signal comparison
79	EFM	O	EFM signal output terminal
80	A.VDD		VDD for analog circuit

\*UPD63700GF1

PA2022B



## 8. CIRCUIT DIAGRAM AND PATTERN

## 8.1 CONNECTOR UNIT

### ● Circuit Diagram

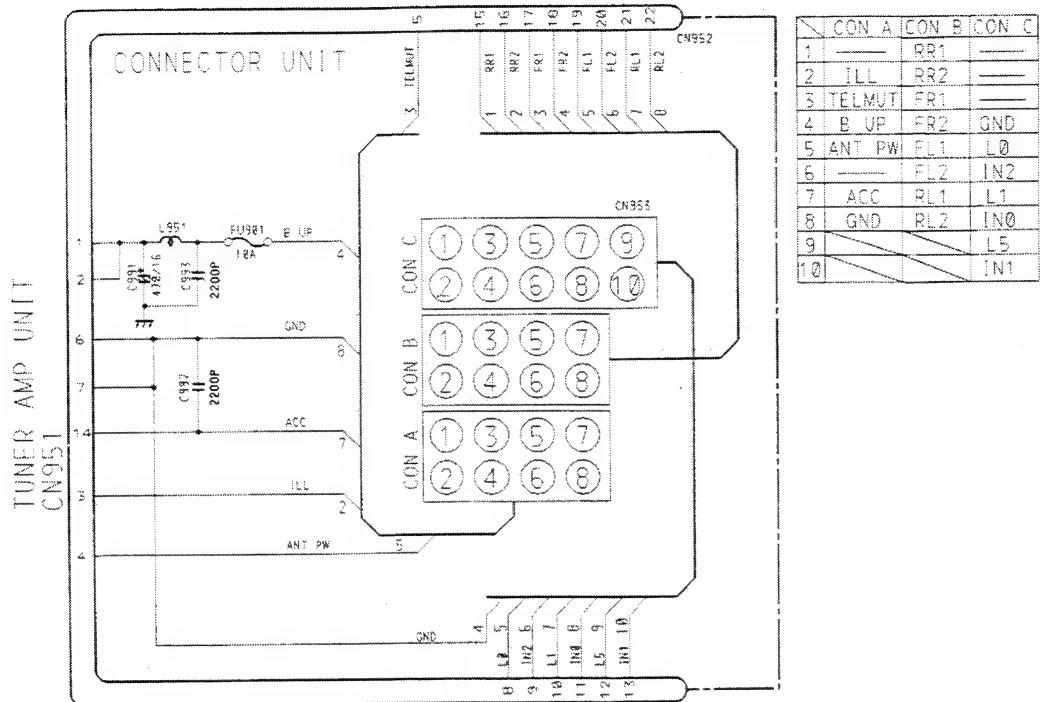


Fig.8

## ● Connection Diagram

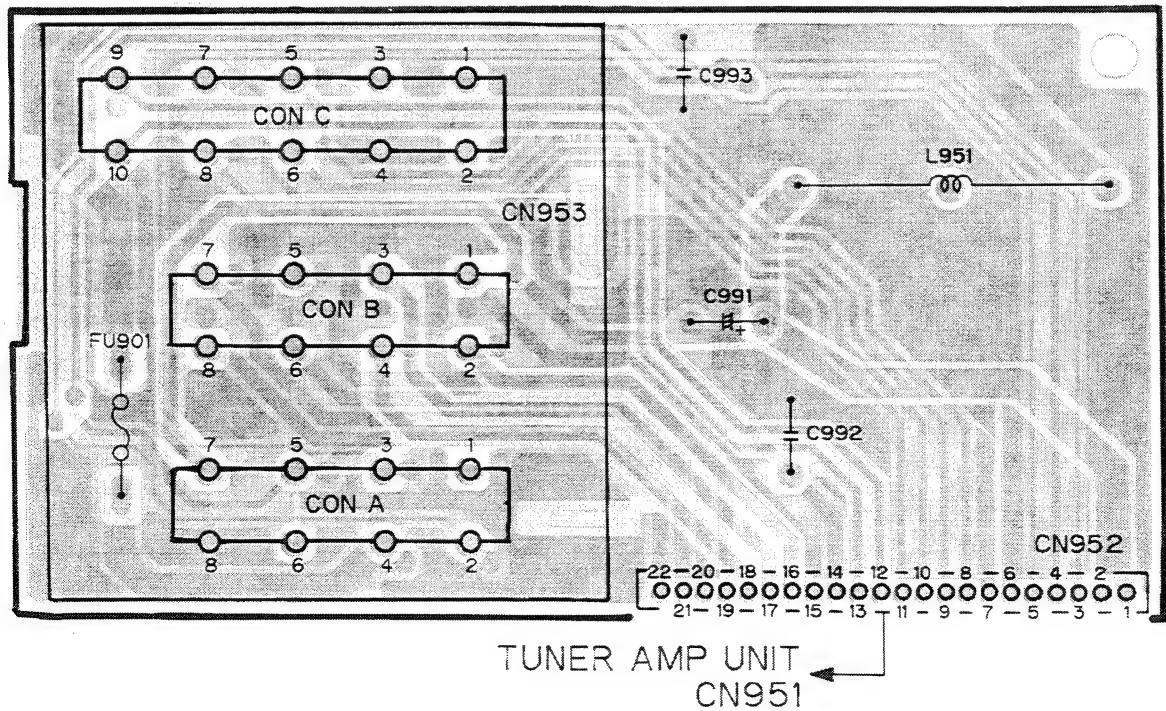
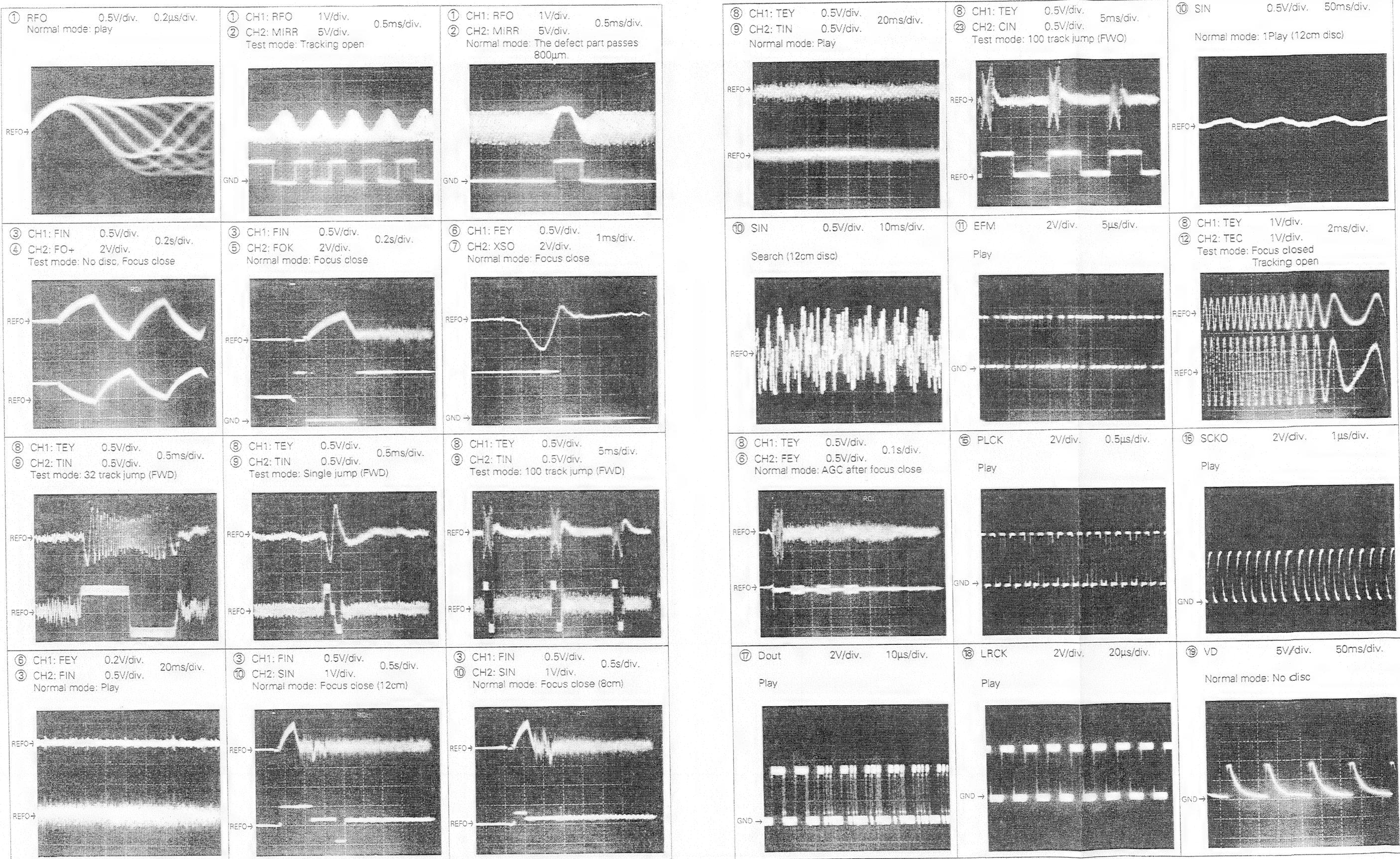
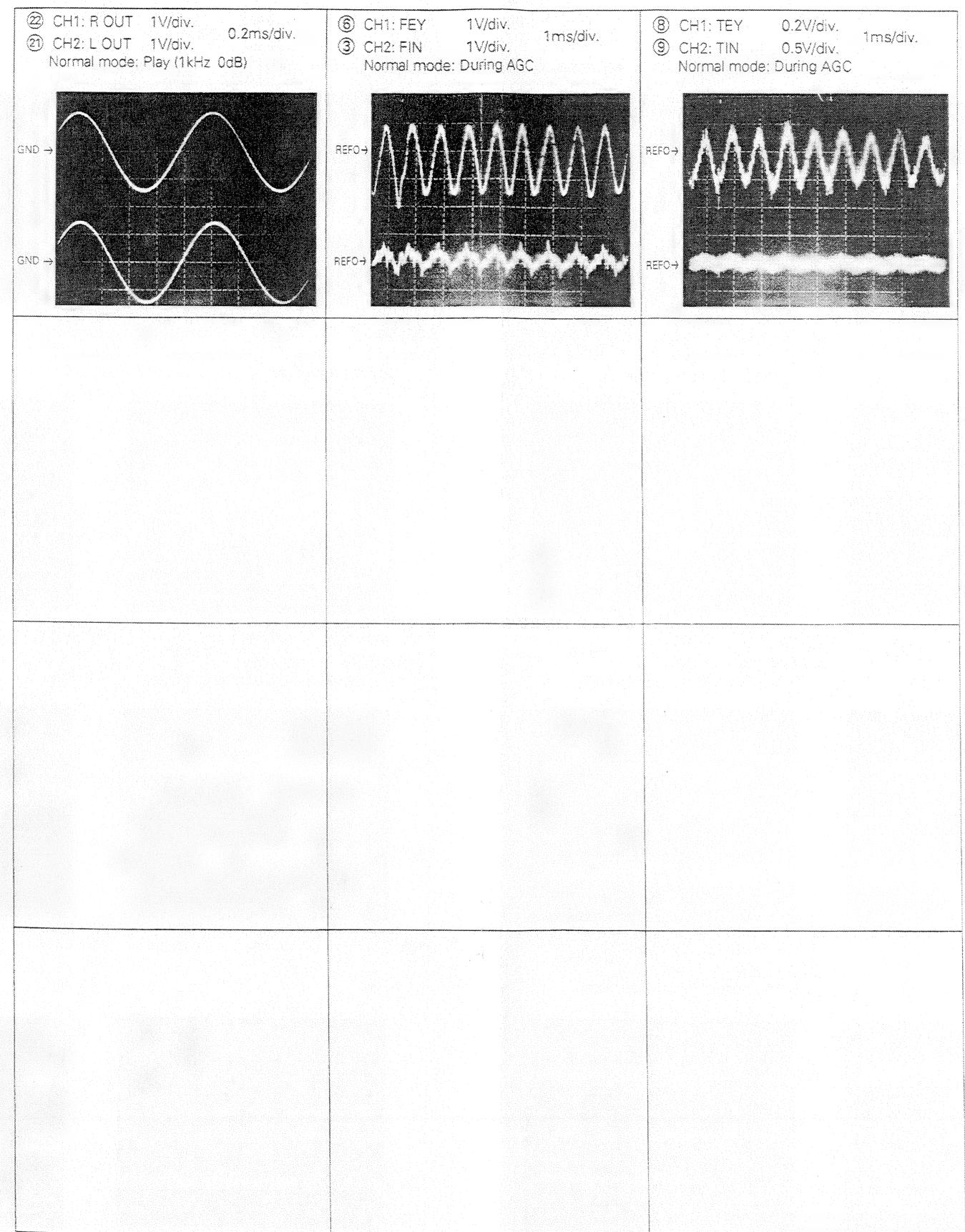


Fig.9

## ● Waveforms

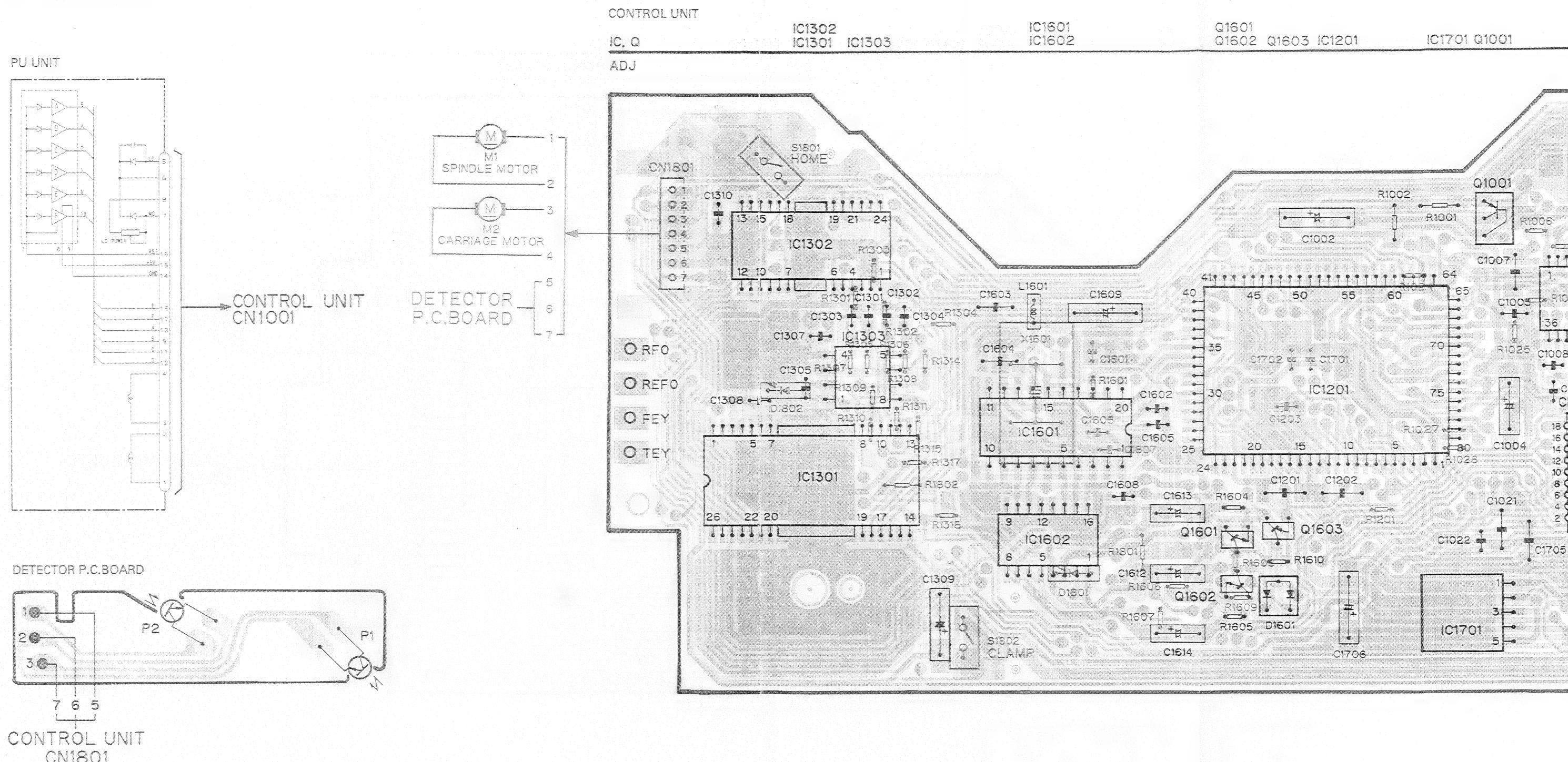
Note: 1. The encircled numbers denote measuring pointes in the circuit diagram.  
 2. Reference voltage  
 REFO: 2.5V





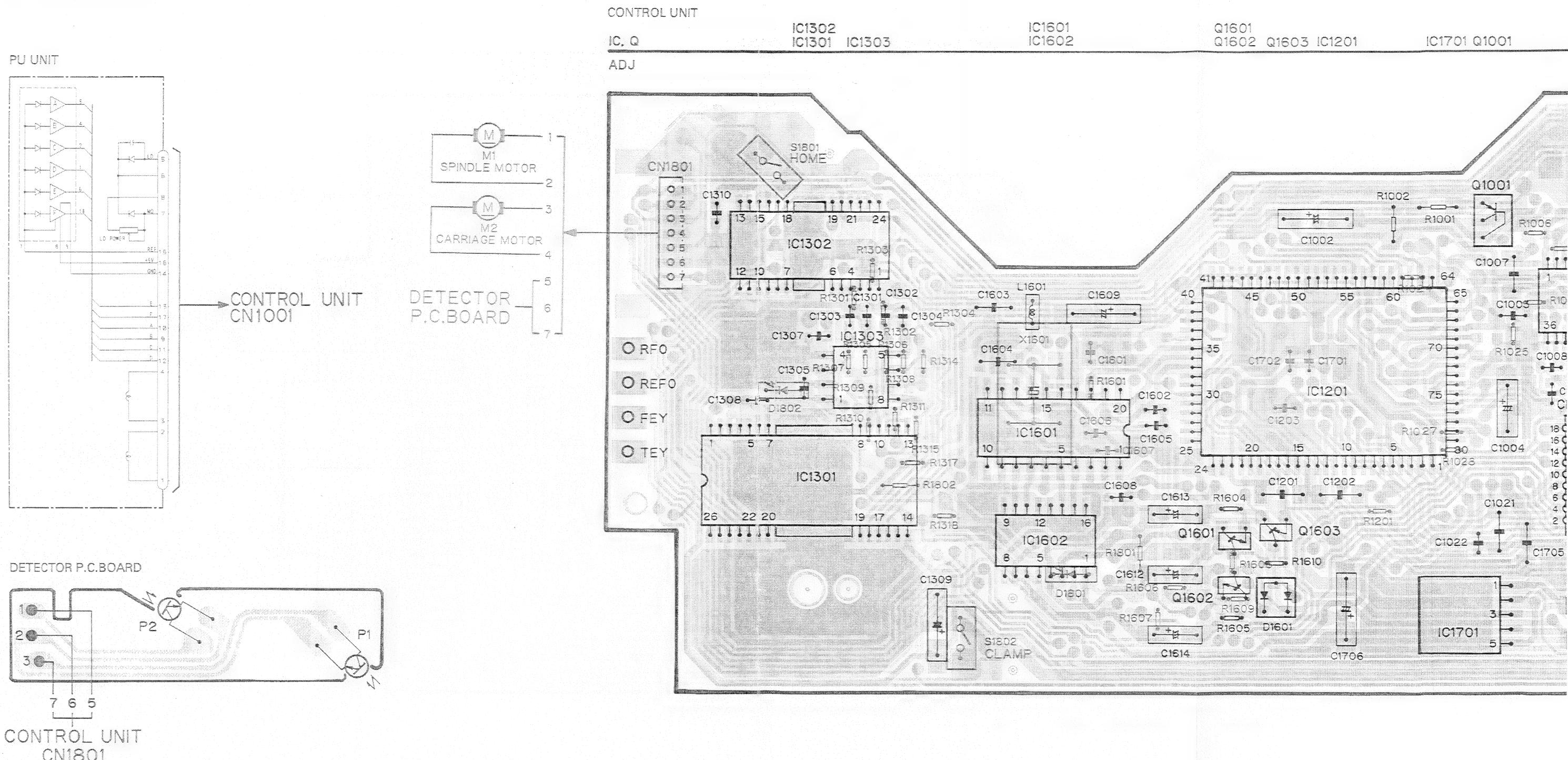
## 8.2 CD MECHANISM MODULE

## ● Connection Diagram



## 8.2 CD MECHANISM MODULE

### ● Connection Diagram



ROL UNIT

IC1302  
IC1301 IC1303

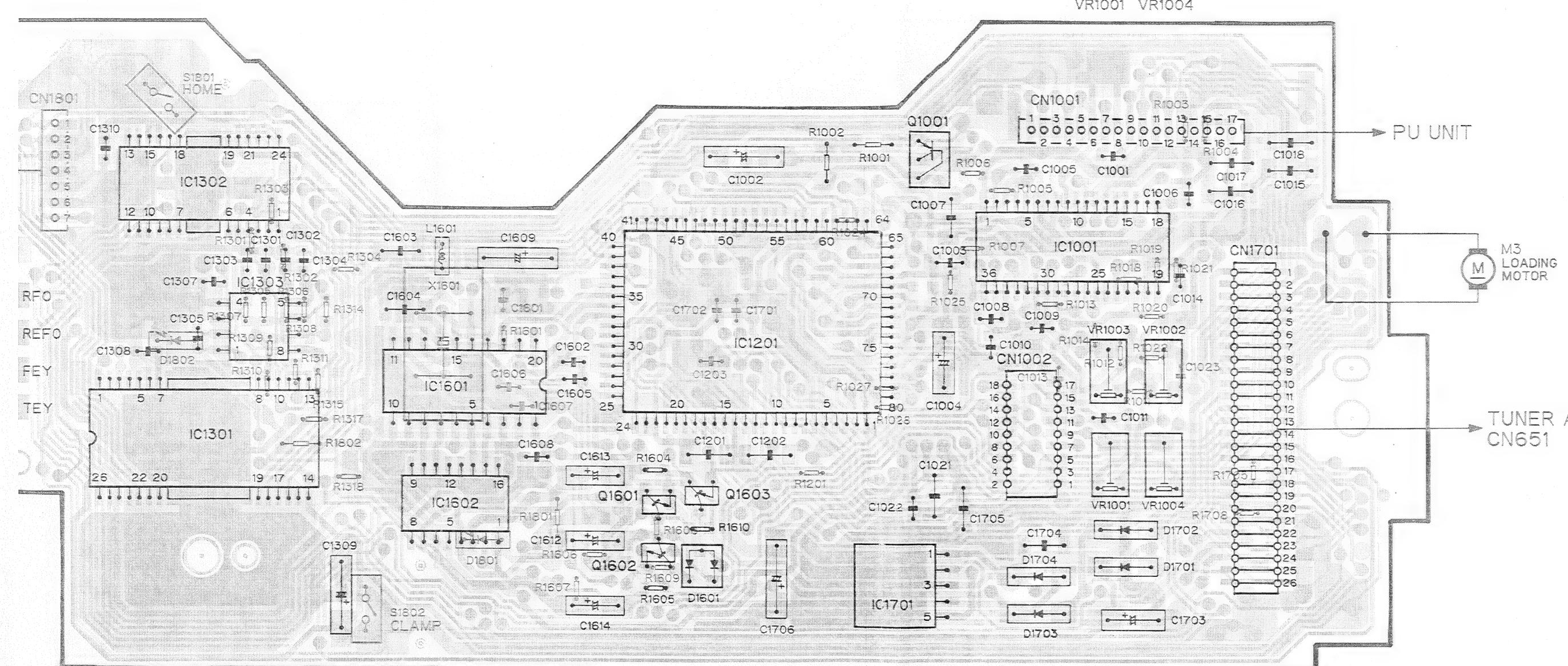
IC1601  
IC1602

Q1601  
Q1602 Q1603 IC1201

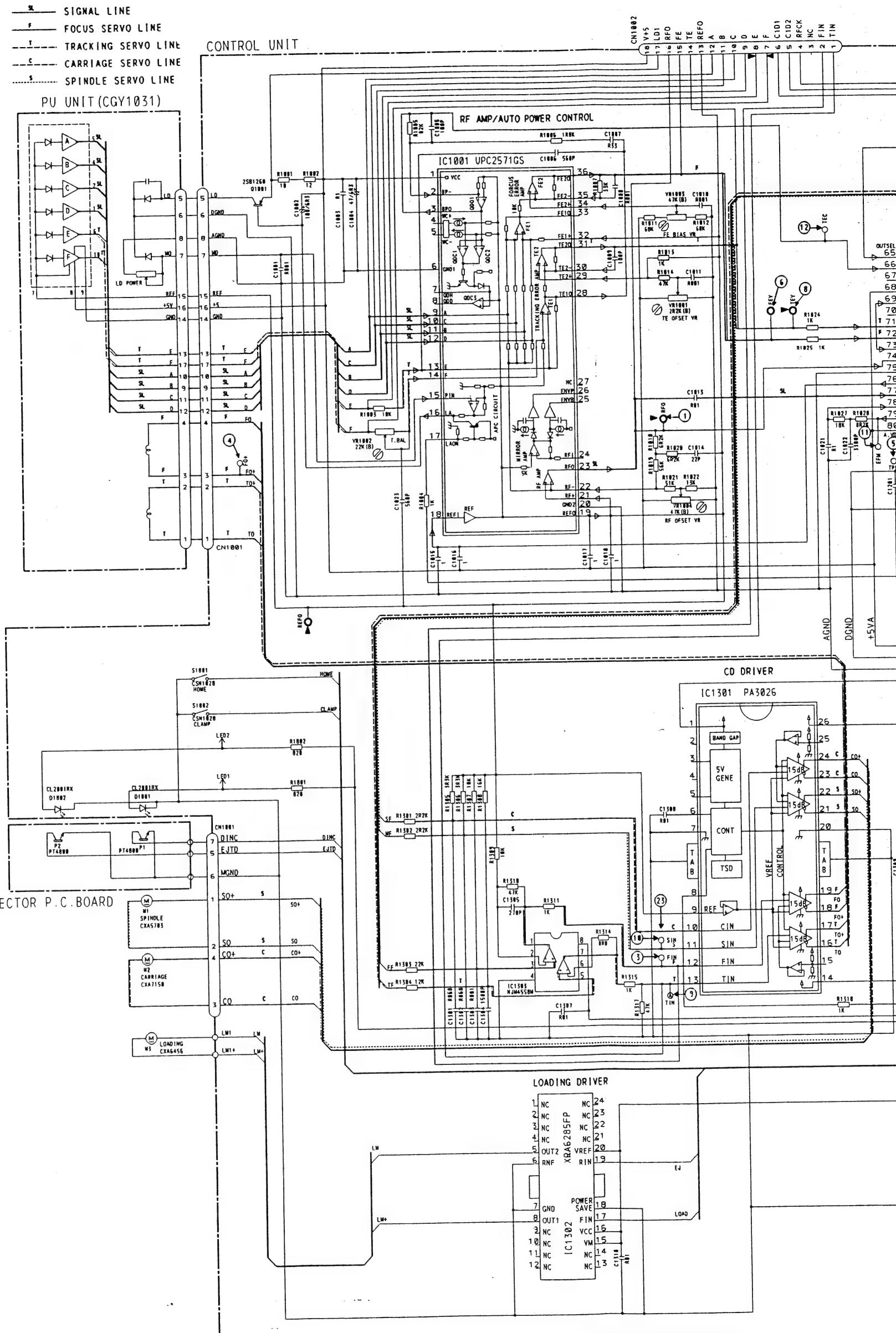
IC1701 Q1001

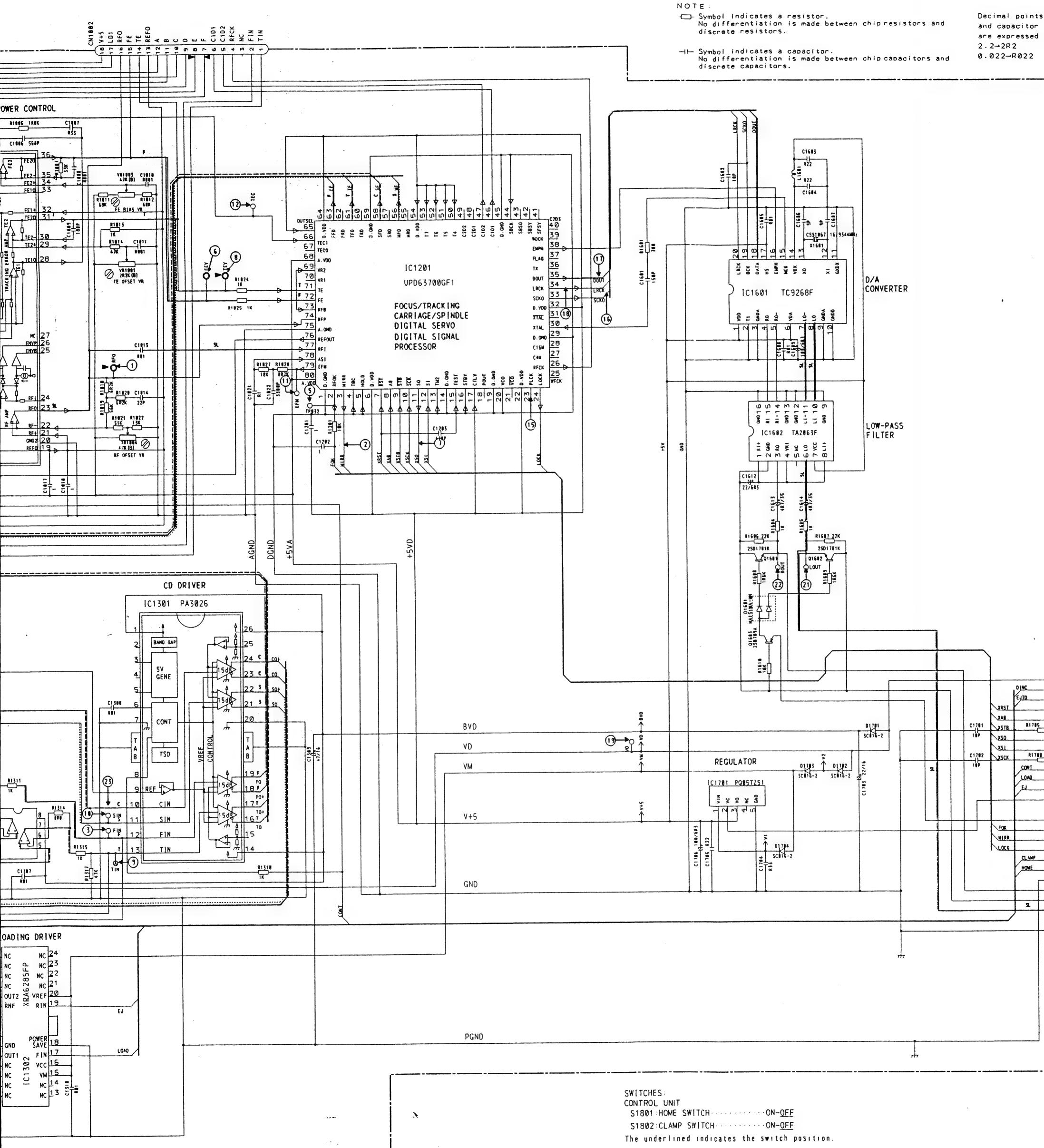
IC1001

VR1003 VR1002  
VR1001 VR1004



● Circuit Diagram





**SWITCHES:**  
 CONTROL UNIT  
 S1801: HOME SWITCH ..... ON-OFF  
 S1802: CLAMP SWITCH ..... ON-OFF  
 The underlined indicates the switch position.

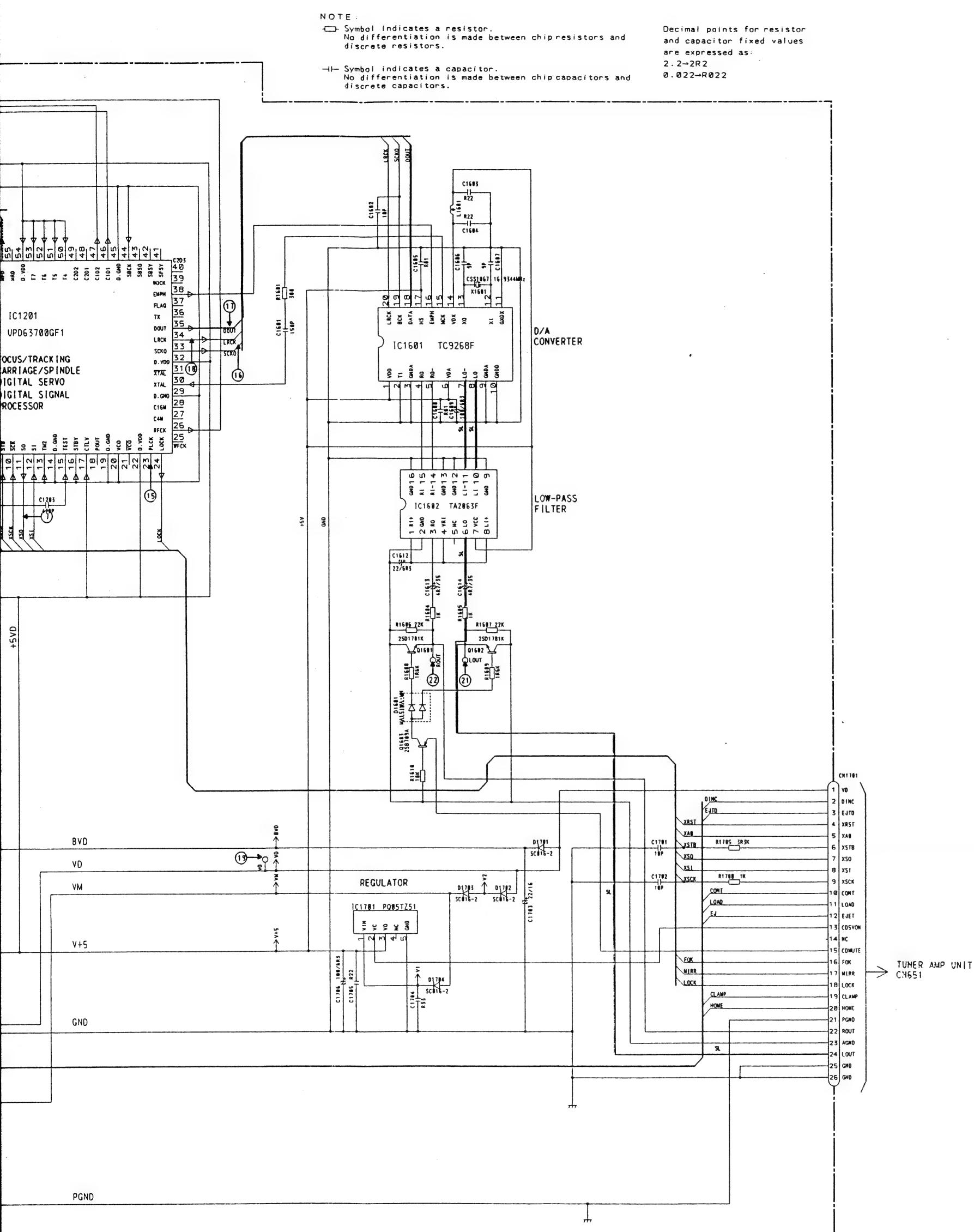
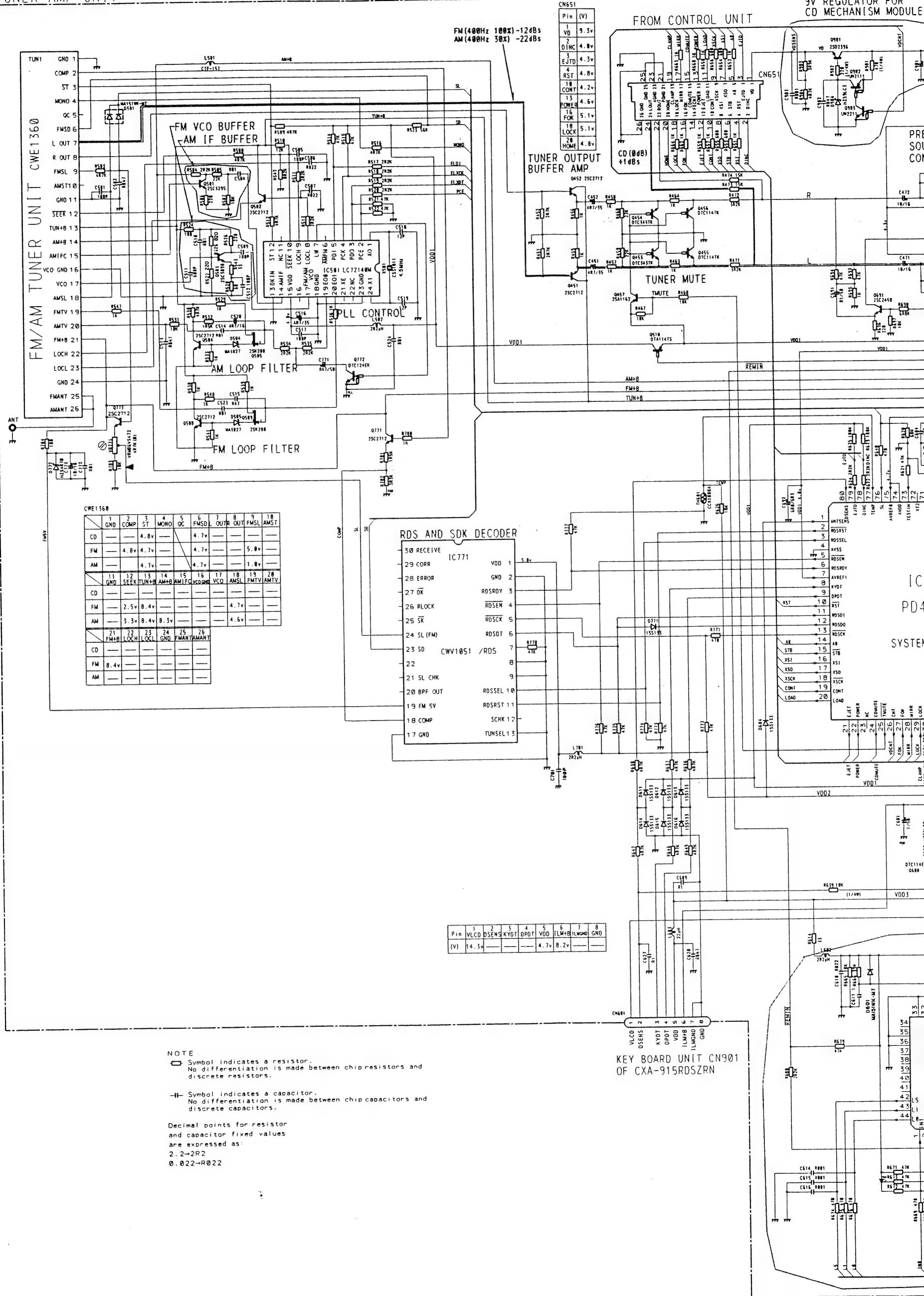


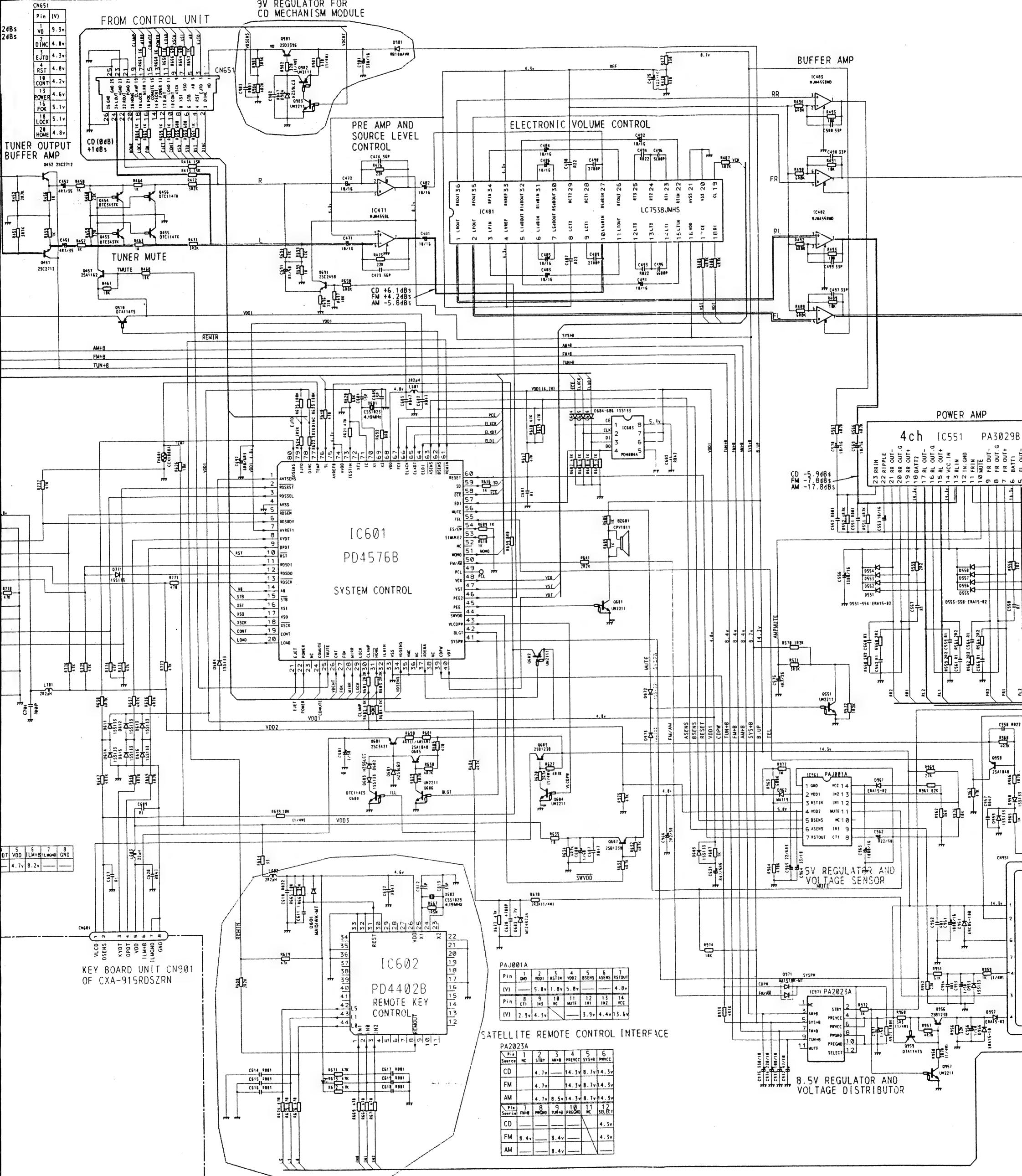
Fig.11

## 8.3 TUNER AMP UNIT

## ● Circuit Diagram

## TUNER AMP UNIT





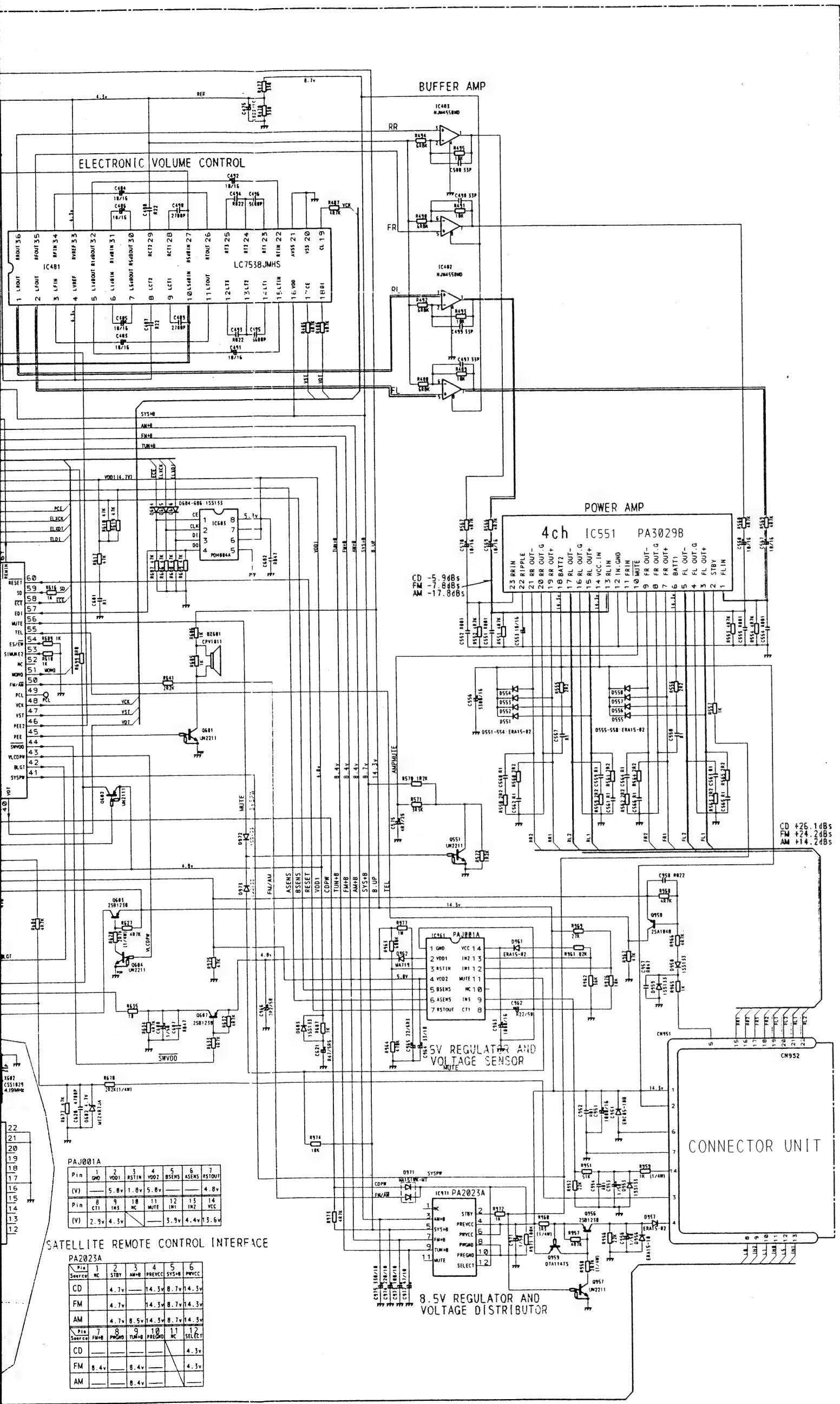


Fig.12

### ● Connection Diagram

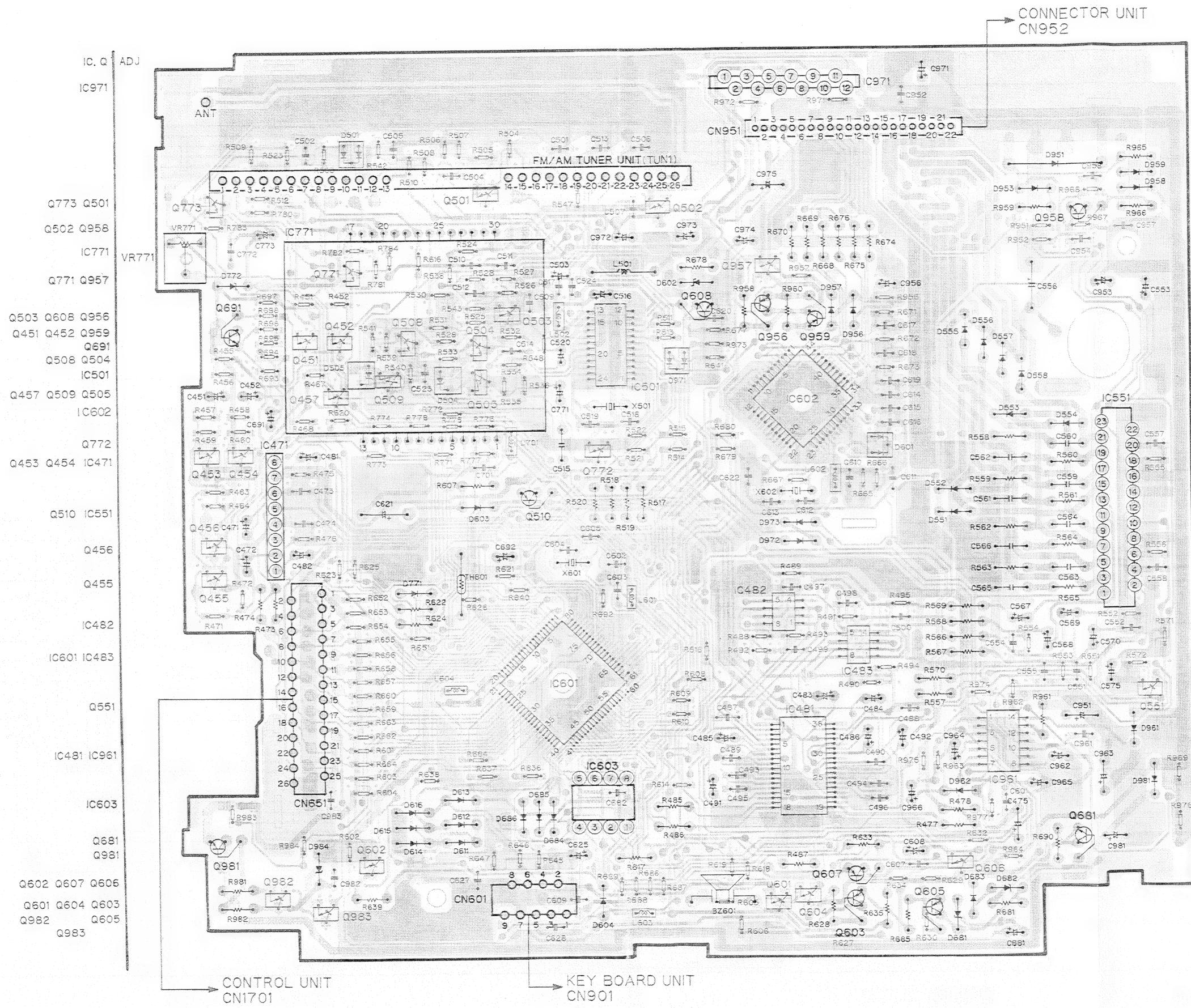


Fig.13

## 8.4 FM/AM TUNER UNIT

## ● Circuit Diagram

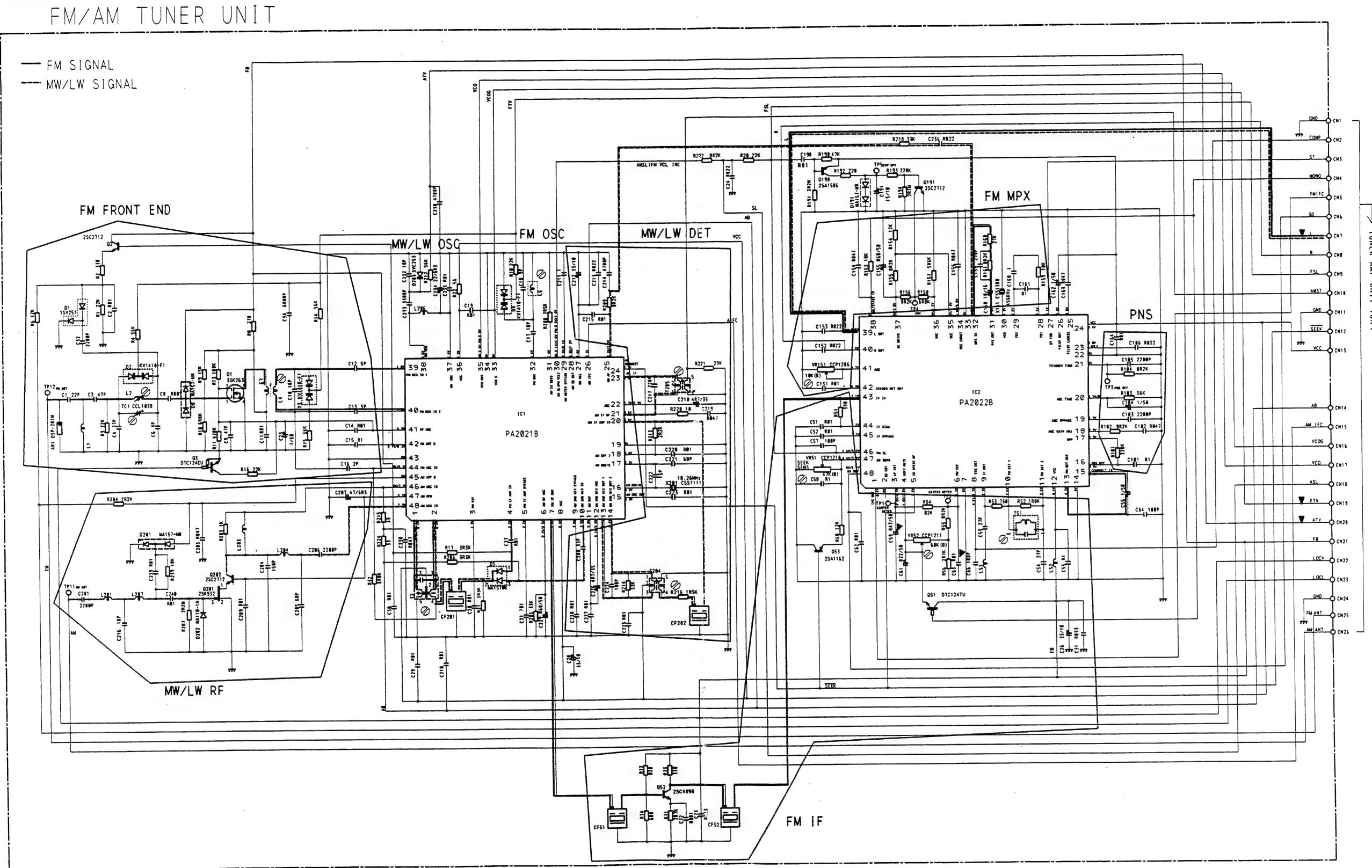


Fig.14

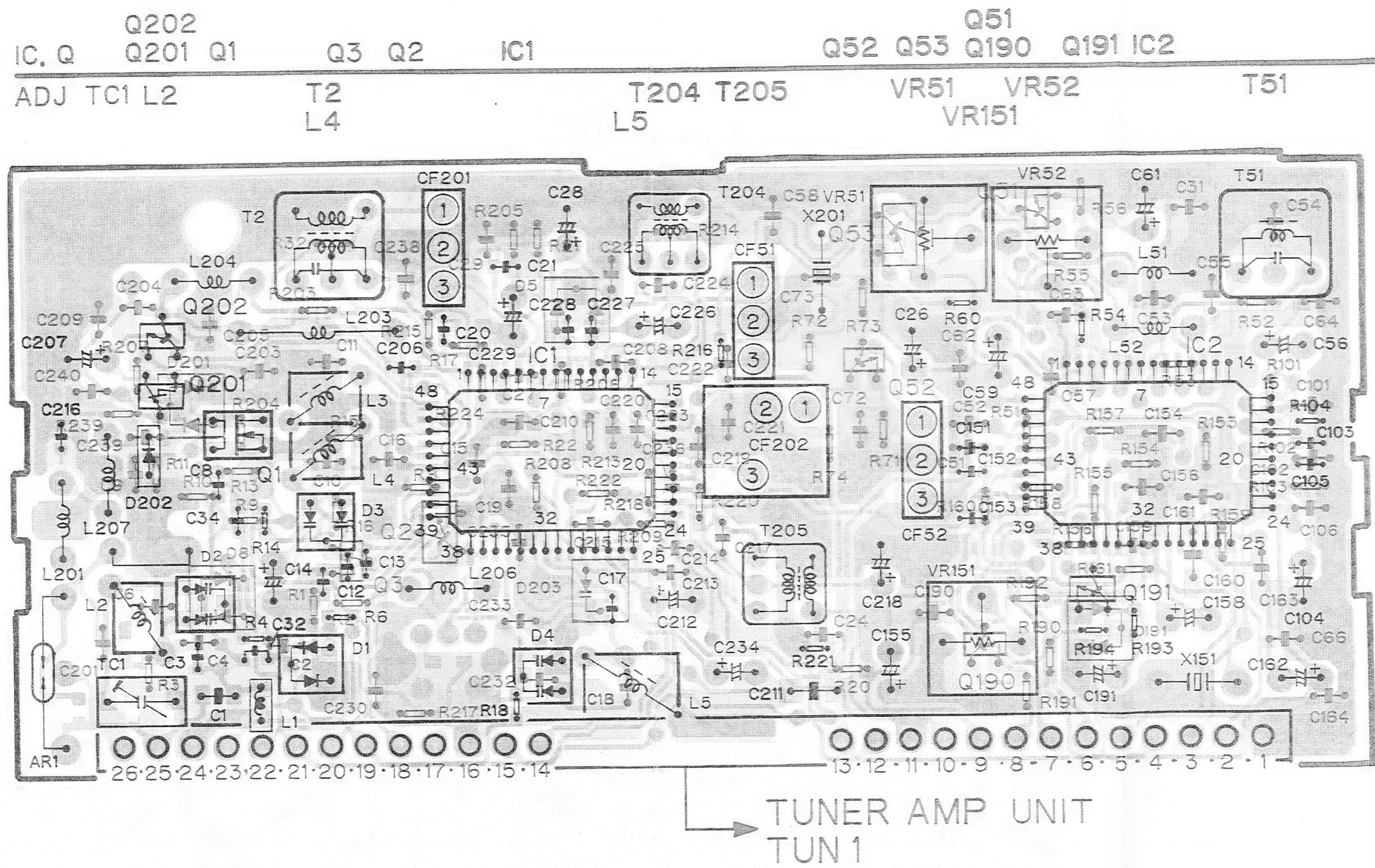
## NOTE:

— Symbol indicates a resistor.  
No differentiation is made between chip resistors and discrete resistors.

—H Symbol indicates a capacitor.  
No differentiation is made between chip capacitors and discrete capacitors.

Decimal points for resistor and capacitor fixed values are expressed as:  
2.2=R2  
0.022=R022

## ● Connection Diagram



## 9. CD MECHANISM MODULE EXPLODED VIEW

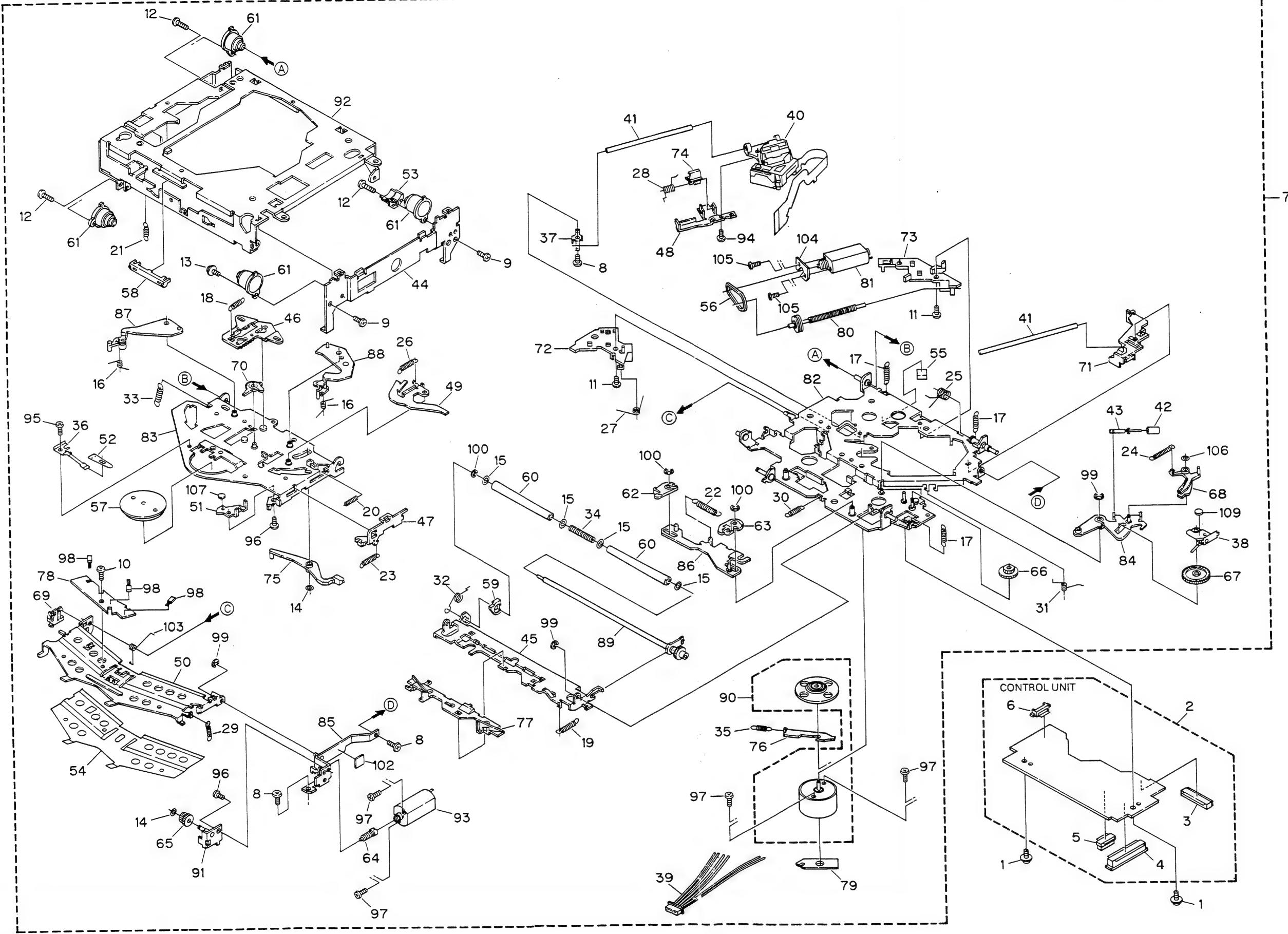


Fig. 16

**NOTE:**

● Parts marked by “\*” are generally unavailable because they are not in our Master Spare Parts List.

**● Parts List**

Mark	No.	Description	Part No.	Mark	No.	Description	Part No.
1	Screw	PMS26P040FMC		46	Lever	CNC4891	
2	Control Unit	CWX1796		47	Lever	CNC4892	
3	Connector(CN1001)	CKS1955		48	Bracket	CNC4893	
4	Connector(CN1701)	CKS2775		49	Arm	CNC4895	
5	Connector(CN1002)	CKS2811		50	Arm	CNC5566	
6	Connector(CN1801)	CKS2196		51	Bracket	CNC5424	
7	CD Mechanism Unit	CXA7048		52	Spacer	CNM3315	
8	Screw	BMZ20P030FMC		53	Holder	CNV4018	
9	Screw	BSZ20P040FMC		54	Sheet	CNM3693	
10	Screw	CBA1250		55	Bracket	CNM3917	
11	Screw	CBA1077		56	Belt	CNT1053	
12	Screw	CBA1230		57	Clamper Unit	CXA6999	
13	Screw	CBA1296		58	Guide	CNV2891	
14	Washer	CBF1038		59	Holder	CNV3276	
15	Washer	CBF1060		*	60	Roller	CNV3412
16	Spring	CBH1415		61	Damper	CNV3974	
17	Spring	CBH1417		62	Arm	CNV3565	
18	Spring	CBH1418		63	Arm	CNV3992	
19	Spring	CBH1421		64	Gear	CNV3567	
20	Spring	CBH1423		65	Gear	CNV3568	
21	Spring	CBH1457		66	Gear	CNV3569	
22	Spring	CBH1552		67	Gear	CNV3570	
23	Spring	CBH1553		68	Arm	CNV3571	
24	Spring	CBH1554		69	Holder	CNV3572	
25	Spring	CBH1665		70	Gear	CNV3573	
26	Spring	CBH1556		71	Holder	CNV3574	
27	Spring	CBH1557		72	Holder	CNV4067	
28	Spring	CBH1558		73	Holder	CNV3576	
29	Spring	CBH1664		74	Rack	CNV3577	
30	Spring	CBH1560		75	Arm	CNV3578	
31	Spring	CBH1576		76	Plate	CNV3629	
32	Spring	CBH1577		77	Guide	CNV3694	
33	Spring	CBH1666		*	78	Gathering P.C.Board	CNX2103
34	Spring	CBH1583		79	Gathering P.C.Board	CNX2128	
35	Spring	CBH1628		80	Screw Unit	CXA2375	
36	Spring	CBL1170		81	Motor Unit	CXA7150	
37	Spring	CBL1171		82	Chassis Unit	CXA6979	
38	Spring	CBL1200		83	Arm Unit	CXA5603	
39	Connector	CDE4147		84	Arm Unit	CXA5604	
40	PU Unit	CGY1031		85	Bracket Unit	CXA5605	
41	Shaft	CLA2220		86	Lever Unit	CXA6975	
42	Roller	CLA2255		87	Arm Unit	CXA5607	
43	Shaft	CLA2256		88	Arm Unit	CXA5608	
44	Frame	CNC5661		89	Gear Unit	CXA6976	
45	Arm	CNC5565		90	Motor Unit	CXA5703	

Mark	No.	Description	Part No.
91	Bracket Unit	CXA5938	
92	Frame Unit	CXA6192	
93	Motor Unit	CXA6456	
94	Screw	JFZ17P035FNI	
95	Screw	JFZ20P014FMC	
96	Screw	JFZ20P020FZK	
97	Screw	JFZ20P025FMC	
98	Photo-transistor	PT4800	
99	Washer	YE15FUC	
100	Washer	YE20FUC	

Mark	No.	Description	Part No.
101	.....		
102	Sheet	CNM4028	
103	Spring	CBH1710	
104	Spacer	CNC5436	
105	Screw	JFZ20P045FMC	
106	Washer	CBF1061	
107	Cushion	CNM4089	
108	Bracket	CNM3917	
109	Cushion	CXX1136	

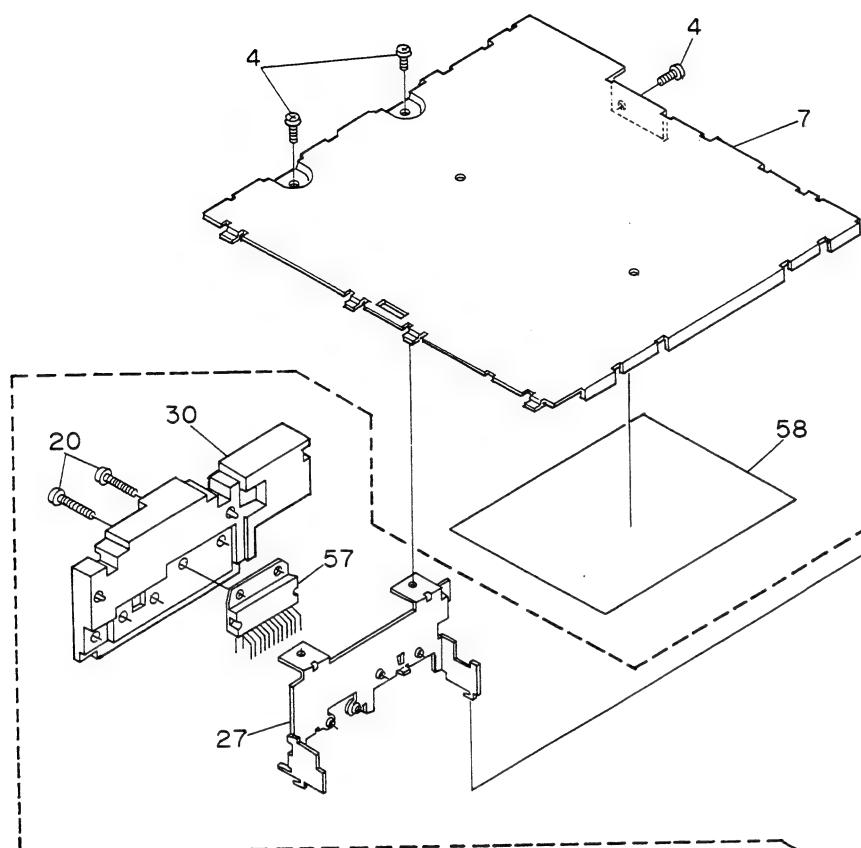
## 10. CHASSIS EXPLODED VIEW

### ● Parts List

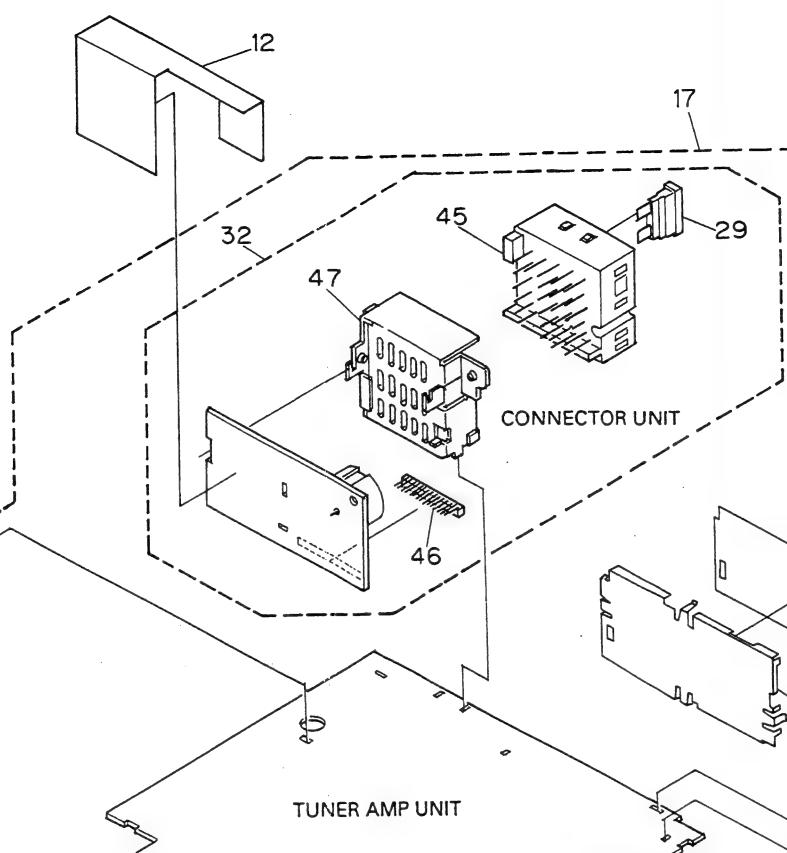
Mark	No.	Description	Part No.
1	Screw	BMZ26P050FMC	
2	Screw	BMZ26P050FZK	
3	Screw	BMZ26P080FMC	
4	Screw	BMZ30P050FMC	
5	Screw	BMZ30P120FMC	
6	Screw	CBA1324	
7	Case	CNB1791	
8	Earth Plate	CNC5130	
9	.....		
10	Spacer	CNM3908	
11	Insulator	CNM4230	
12	Insulator	CNM3894	
13	.....		
14	P.C.Board	CNP3534	
15	Bush	CNV3253	
*	16	Clamper	CNV3954
	17	Tuner Amp Unit	CWX1817
	18	Chassis Unit	CXA7277
	19	CD Mechanism Module	CXK2814
	20	Screw	BMZ26P120FMC
	21	Screw	BMZ30P050FMC
	22	Connector(CN601)	CKS1529
	23	Connector(CN651)	CKS1546
	24	Spacer	CNM4367
	25	Holder	CNC5529
	26	Holder	CNC5013
	27	Bracket	CNC5146
	28	Insulator	CNM4383
	29	Fuse(FU901)	CEK1136
	30	Heat Sink	CNR1307
	31	FM/AM Tuner Unit	CWE1360
	32	Connector Unit	CWX1879
	33	Holder Unit	CXA7230
	34	Screw	BPZ20P060FMC
	35	Spring	CBH1659
	36	Socket	CKS2782
	37	Holder	CNC4943
	38	Holder	CNC4944
	39	P.C.Board	CNP3532
	40	Arm	CNV3696
	41	Arm	CNV3697
	42	Detach Mechanism Unit	CXA7300
	43	Panel Unit	CXA7236
	44	Screw	PMS20P030FZK
	45	Connector(CN953)	CKM1088
	46	Connector(CN952)	CKS2905
	47	Holder	CNC5144
	48	Washer	CBF1039
	49	Spring	CBH1484
	50	Arm	CNV3292
	51	Arm	CNV3293
	52	Holder Unit	CXA5124
	53	.....	
	54	Holder	CNC5803
	55	IC(IC971)	PA2023A
	56	Transistor(Q981)	2SD2396
	57	IC(IC551)	PA3029B
	58	Insulator	CNM4077

## ● Chassis

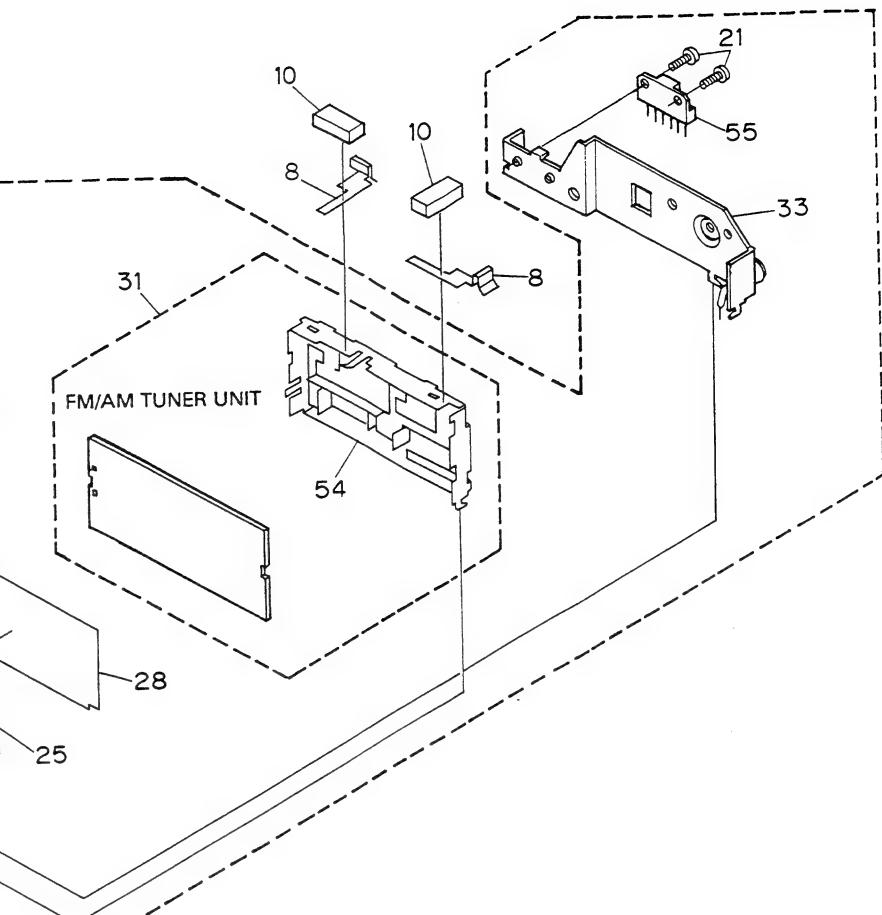
A



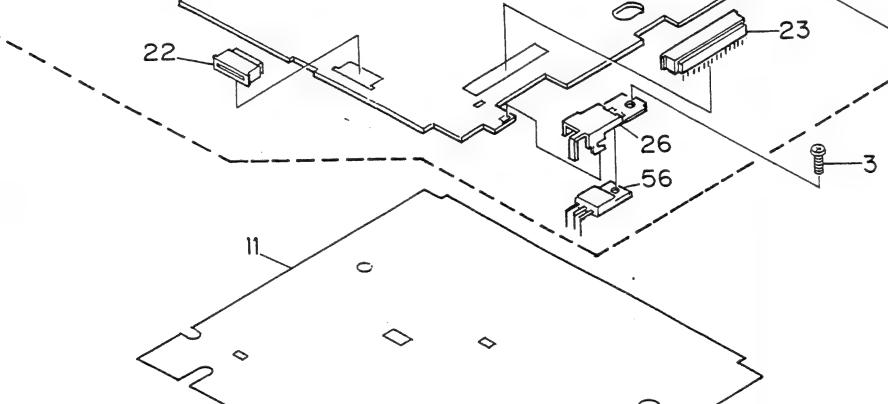
B



CONNECTOR UNIT



C



D

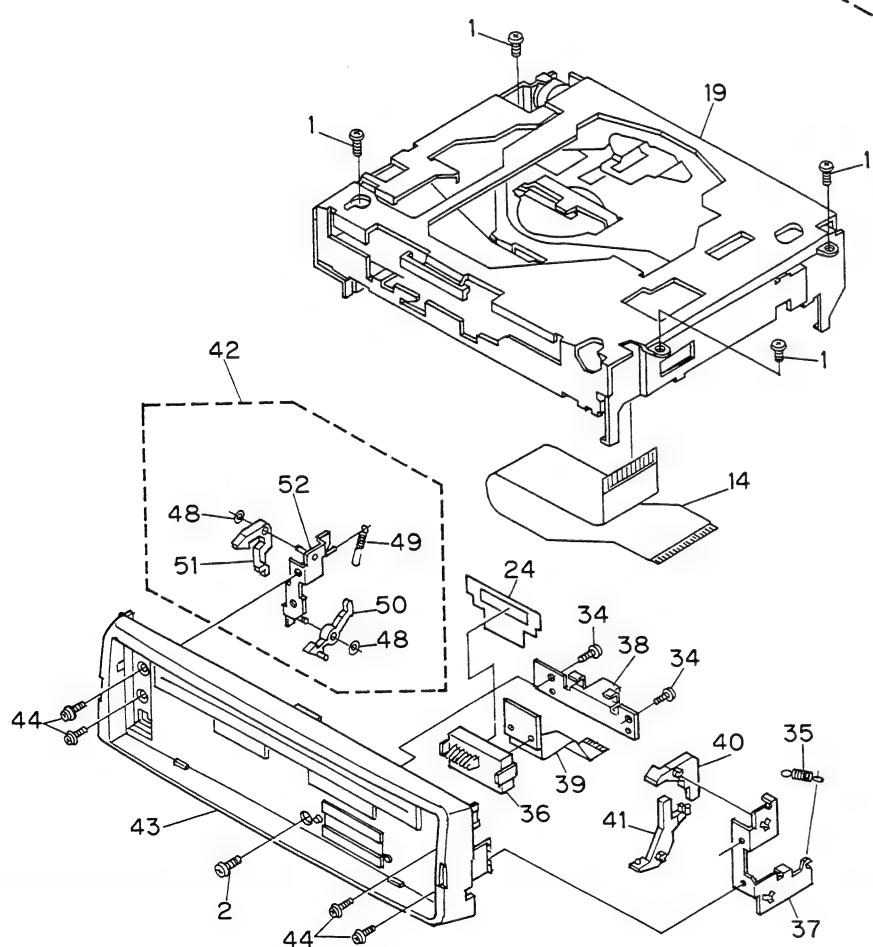


Fig.17

58

## 11. BLOCK DIAGRAM

DEH-2006RDSZRN

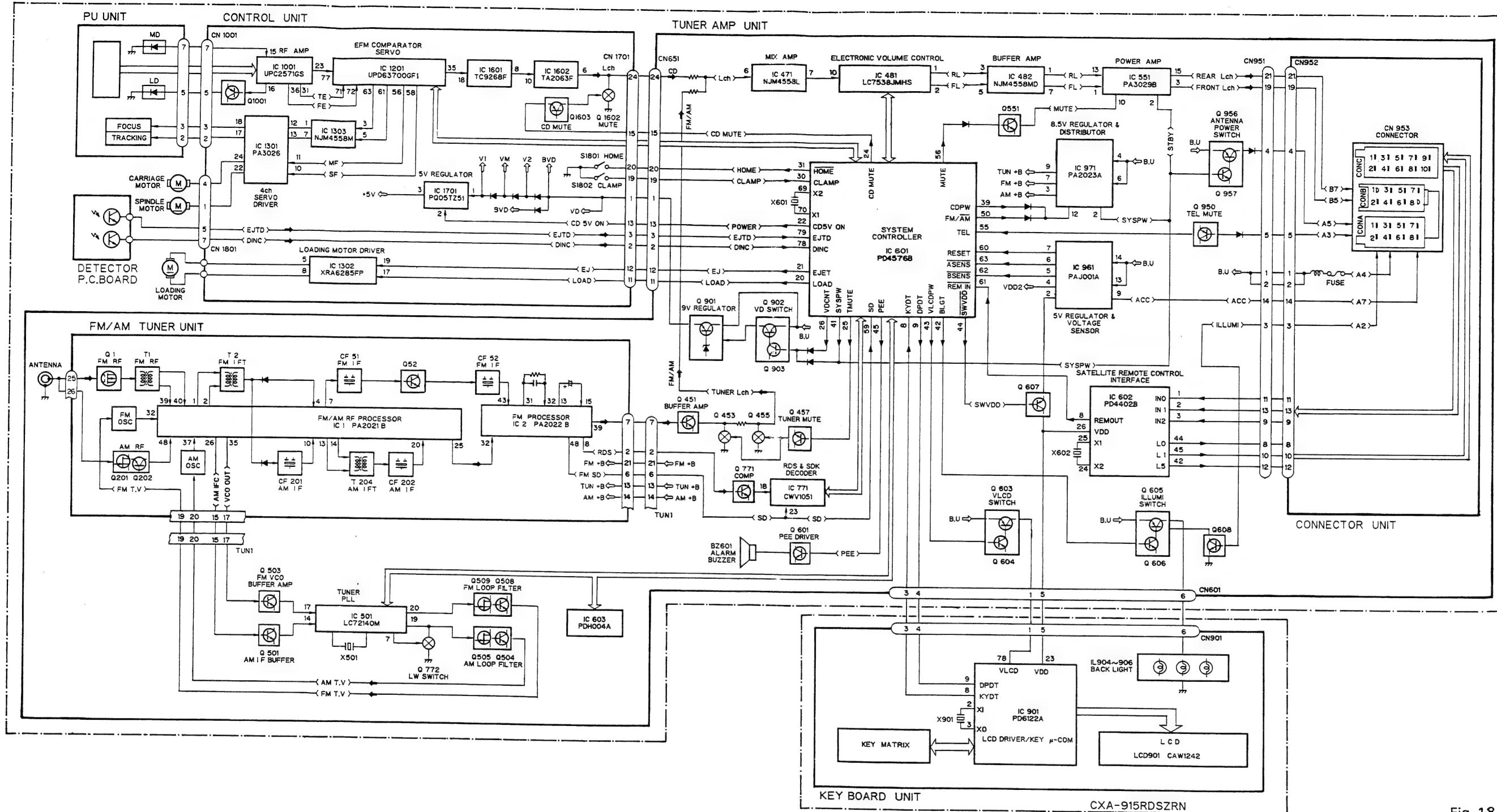


Fig. 18

## 12. PACKING METHOD

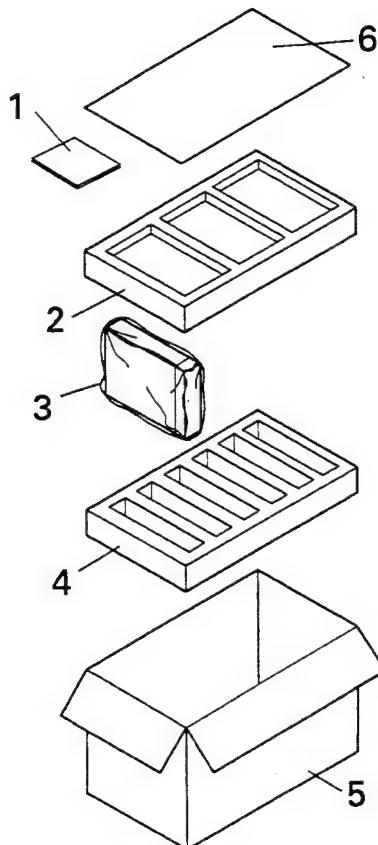


Fig.19

### ● Parts List(DEH-2006RDSZRN/EW)

Mark	No.	Description	Part No.
1		Owner's Manual	CRD1889
2		Protector	CHP1619
3		Polyethylene Bag	CEG-162
4		Protector	CHP1620
5		Contain Box	CHL2612
6		Paper Sheet	CHW1442

- The DEH-2006ZRN/X1B/EW Parts List enumerates the parts which differ from those for the DEH-2006RDSZRN/EW only. The parts other than those enumerated in the DEH-2006ZRN/X1B/EW Parts List are identical with those in the DEH-2006RDSZRN/EW Parts List, to which you are requested to refer, accordingly.

Mark No.	Description	DEH-2006RDSZRN/EW	DEH-2006ZRN/X1B/EW
		Part No.	Part No.
2	Protector	CHP1619	UHP-011
3	Polyethylene Bag	CEG-162	UEG-002
4	Protector	CHP1620	UHP-010
5	Contain Box	CHL2612	UHD-014

# Service Manual

ORDER NO.  
**CRT1574**

CD MECHANISM MODULE

# **CX-540**

- This service manual describes operation of the CD mechanism incorporated in models listed in the table below.
- When performing repairs use this manual together with the specific manual for model under repair.

Model	Service Manual	CD Mechanism Module	CD Mechanism Unit
DEH-605RDS/EW,X1B/EW	CRT1563	CXK2810	CXA6475
DEH-505SDK/GR			
DEH-505/EW,X1B/EW			
DEH-405SDK/GR			
DEH-505/UC	CRT1570	CXK2800	CXA5970
DEH-503/ES			
DEH-45/UC			
DEH-405/UC			
DEH-305/US			
DEH-303/ES			
DEH-205/UC			
DEH-203/ES			

## CONTENTS

1. CIRCUIT DESCRIPTION.....	2
2. MECHANISM DESCRIPTION .....	16
3. DISASSEMBLY .....	19

**PIONEER ELECTRONIC CORPORATION** 4-1, Meguro 1-Chome, Meguro-ku, Tokyo 153, Japan

PIONEER ELECTRONICS SERVICE INC. P.O.Box 1760, Long Beach, California 90801 U.S.A.

PIONEER ELECTRONICS OF CANADA, INC. 300 Allstate Parkway Markham, Ontario L3R 0P2 Canada

PIONEER ELECTRONIC [EUROPE] N.V. Haven 1087 Keetberglaan 1, 9120 Melsele, Belgium

PIONEER ELECTRONICS AUSTRALIA PTY.LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia TEL:[03]580-9911

© PIONEER ELECTRONIC CORPORATION 1994

4/173

K-FFK.FEB. 1994 Printed in Japan

## 1. CIRCUIT DESCRIPTION

### 1.1 PRE-AMPLIFIER STAGE (IC1001 UPC2571GS)

The optical signals are converted to voltage signals using an i/v amplifier inside the PU unit.

These voltage signals (A - F) are further processed by this pre-amp stage.

The pre-amplifier performs the following tasks

- > Automatic power control of the PU unit's laser diode.
- > Generation of an equalized RF signal from the photo-detector outputs (A - D).
- > Generation of a focus error signal from the photo-detector outputs (A - D).
- > Generation of a tracking error signal from the photo-detector outputs (E & F).
- > Generation of a tracking zero crossing signal from the photo-detector outputs (E & F).

This IC runs from a single voltage supply (+5V). The reference voltage for this IC, the PU unit, and all the servo circuitry is REFO. This is obtained from pin 19 of the pre-amp ; which in turn is derived from the output REFOUT of the servo LSI, IC1201, UPD63700GF. The voltages REFOUT and REFO should be at +2.5V DC with respect to GND. All measurements and observations should be made using REFO as the reference as this is a buffered output. Care should be taken not to inadvertently short REFO to GND.

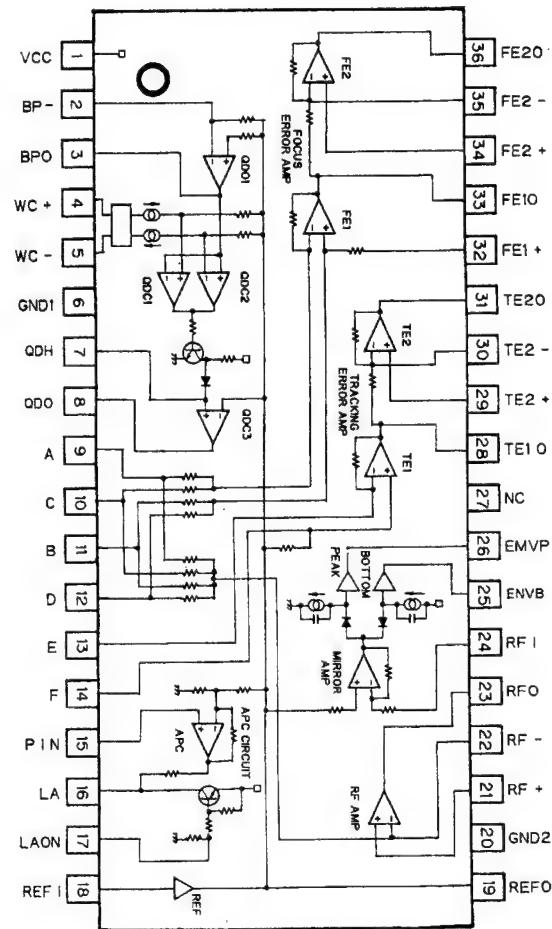


Fig.1 : UPC2571GS BLOCK DIAGRAM

#### 1) Automatic Power Control (APC)

The laser diode's junction voltage varies greatly with temperature ; causing large output variations in optical power. To avoid this, a monitor diode is used in a feedback circuit to keep the optical power constant. As two different manufacturer's laser diodes are used the LD current falls into two broad bands : approx. 40mA and approx. 60mA.

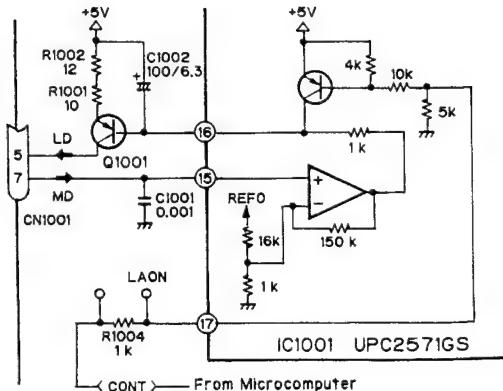


Fig.2 : APC CIRCUIT

## 2) RF Amplifier

This performs a simple summation of the photo-detector outputs A,B,C & D, amplifies, and equalizes to produce the RF signal at RFO. The RF eye pattern may be monitored here. The RFO OFFSET volume is used to ensure that the RFO waveform has the correct offset relative to the FOK threshold level inside the servo LSI UPD63700GF. The FOK signal is used in the focus close sequence, and during play to control the defect circuit inside the UPD63700GF.

The AC coupled RFO signal, RFI, is used by the UPD63700GF to generate the EFM signal which is used in turn by the DSP spindle CLV control sections.

For low frequency signals :

$$\text{VRFO} = (A+B+C+D) \times (R1018+R1019)/10k = (A+B+C+D) \times 6.22$$

The RFO waveform should have an amplitude of approx. 1.9Vpp, with its upper envelope at +1.1V DC w.r.t. REFO.

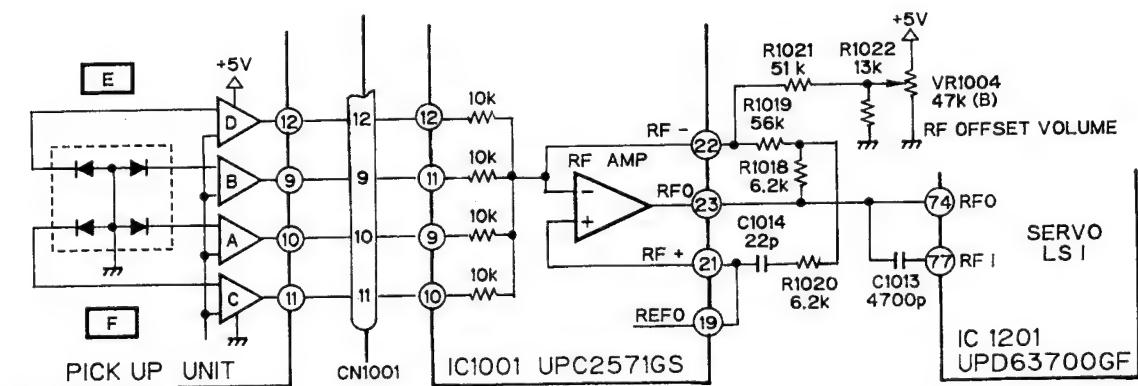


Fig.3 : RFO AMPLIFIER

## 3) Focus Error Amplifier

This produces a focus error signal used as the basis for the focus servo.

$$\text{VFEY} = ( (A+C)-(B+D) ) \times 5 \times (R1007//20k)/10k = \text{FE} \times 6.23 \quad (\text{FE} = \text{PU unit focus error})$$

The S-Curve at FEY should have an amplitude of approx. 1.9Vpp.

The second amplifier stage is also a low pass filter,  $f_c=11\text{kHz}$ , and has a bias volume adjustment. This adjustment is used to vary the reference bias level of the focus servo loop and is adjusted to obtain an optimum eye pattern at RFO.

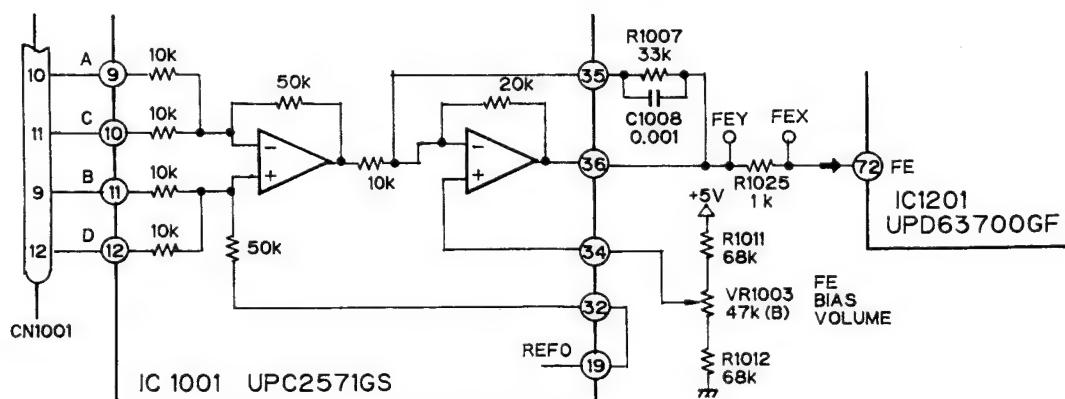


Fig.4 : FOCUS ERROR AMPLIFIER

#### 4) Tracking Error Amplifier

This produces the tracking error signal used in the tracking servo loop.

$$VTEY = (25 \times E) - (25 \times F \times 2 \times 10k / (T.BAL + 10k))$$

Normally, the sensitivity of E & F are the same and  $T.BAL = 10k$

$$\Rightarrow VTEY = 25 \times (E - F)$$

If, however, the E and F sensitivities are different the T.BAL volume can be used to cancel out the unbalance. The offset adjustment TE OFFSET is to cancel any DC offsets from the photo-detectors or op-amps to ensure the reference bias for the servo loop is at zero. Maladjustment of either of these pre-sets will result in poor tracking performance and susceptibility to skipping.

For a typical unit, the TEY level should be approx. 1.8 Vpp.

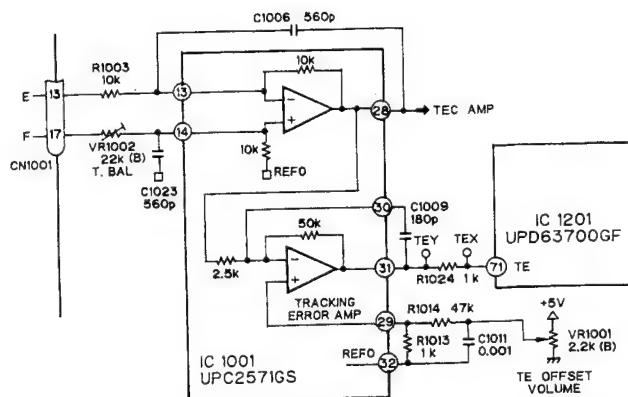


Fig.5 : TRACKING ERROR AMPLIFIER

#### 5) Tracking Zero Crossing Amplifier

TEC1 is basically an amplified, AC coupled, version of the TEY waveform. It is used by the servo LSI IC1201, UPD63700GF to located the zero crossing points of the TEY signal to :

- 1) Determine how many tracks have been crossed during track jumping or a carriage move operation.
- 2) Determine in which direction the lens is moving when attempting to close tracking. This is used in the "tracking brake" circuit described later.

For signals in the range 500Hz - 5kHz :

$$VTEC1 = R1005/R1006 \times (E-F) = 45.5 \times (E-F)$$

Typically TEC1 is around 4.2Vpp, this means that the TEC1 signal level may be greater than the saturation limit of the op-amp and the signal will clip. However, since the servo LSI only uses the zero-crossing points, this is not critical.

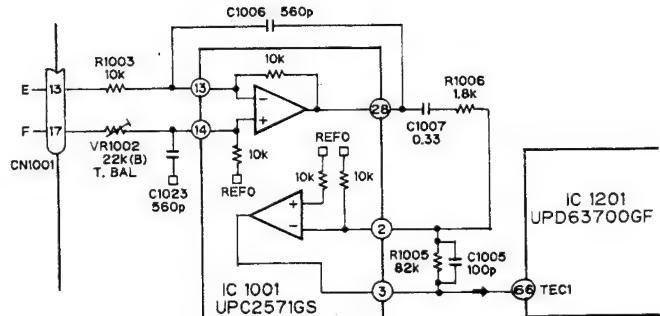


Fig.6 : TRACKING ZERO CROSSING AMPLIFIER

## 1.2 SERVO STAGE (UPD63700GF)

All the servo equalization & sequencing, such as focus closing, track jumping, carriage moving etc. are performed in this LSI, as well as all the DSP functions : data decoding, error protection, interpolation etc. The signals FE & TE are digitized and processed by the servo block to produce the focus, tracking & carriage drive signals, in a PWM format.

The RFI signal is converted to the EFM signal which is decoded by the DSP block to produce an audio signal ; during this process, a spindle servo error signal is also generated and used by the servo block to produce a spindle drive signal, again in PWM form.

The PWM waveforms are filtered, to remove the PWM carrier, amplified by the driver IC1301 PA3026, and output to the corresponding actuators.

### 1) Focus Servo System

The main focus equalization takes place inside the UPD63700GF (figure 7). The equalizer response can be measured between FEX and FIN and has the shape shown in figure 8.

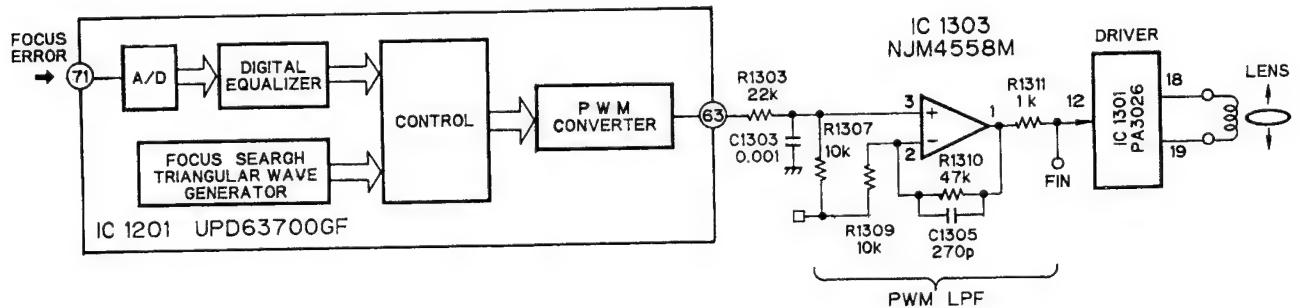


Fig.7 : FOCUS SERVO BLOCK DIAGRAM

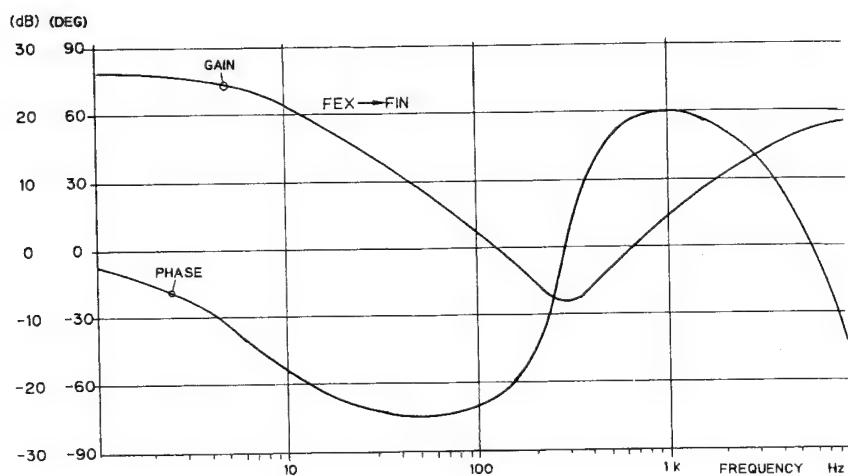


Fig.8 : FOCUS EQUALIZER

In order to smoothly close focus the lens must first be within approx.  $5\mu\text{m}$  of the "just focused" position. This position is achieved by a focus search sequence. The lens is moved up and down using a triangular wave search voltage while the spindle motor is kicked and kept rotating at an appropriate speed. The servo LSI monitors the FE and RFO signals and, at an appropriate point, automatically closes focus.

The conditions for focus close are :

- 1) The lens is moving from a far to a near position relative to the disc,
- 2) FOK = HIGH (5V),
- 3) FZD (IC internal signal) was latched high and
- 4) FE = 0 (w.r.t. REFO).

When the focus servo closes, the servo LSI's serial data

output port, XSO, will show a high-low transition. This is received by the microcomputer as an indication that the servo loop was closed and after about 25mS it begins monitoring the FOK output, via a LPF, to verify that focus is still closed ; in the event of FOK becoming low for an appreciable time, the microcomputer will take appropriate action.

The various signal levels which contribute to focus close are shown in figure 9, which shows the case where focus close has been inhibited.

In TEST MODE, using FOCUS CLOSE MODE 1, conditions 2 & 3 can be inhibited to allow the S-Curve, focus search voltage and the actual lens movement to be observed at ease.

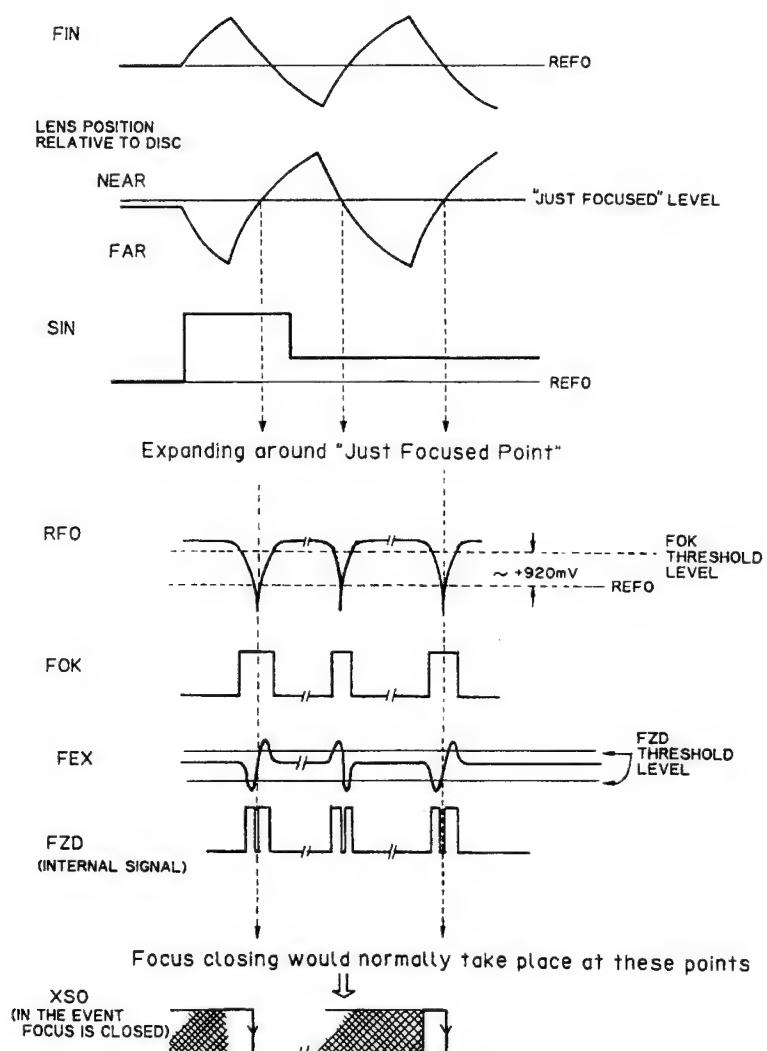


Fig.9 : FOCUS CLOSING SEQUENCE

## a) FOK CIRCUIT

The FOK circuit inside the servo LSI compares the lower envelope of the RFO signal with a threshold level fixed by the microcomputer. Should the envelope level fall below this FOK level then FOK becomes high. This is used during focus close as stated and also during play to control a defect circuit, which switches the focus &

tracking servos into a hold mode should the RFO envelope become disrupted by dirt, grease etc, thus increasing the player's defect response (figure 10). The FOK threshold is approx. +920mV w.r.t. REFO. It is for this reason that the upper envelope should be adjusted to +1.1V DC w.r.t. REFO.

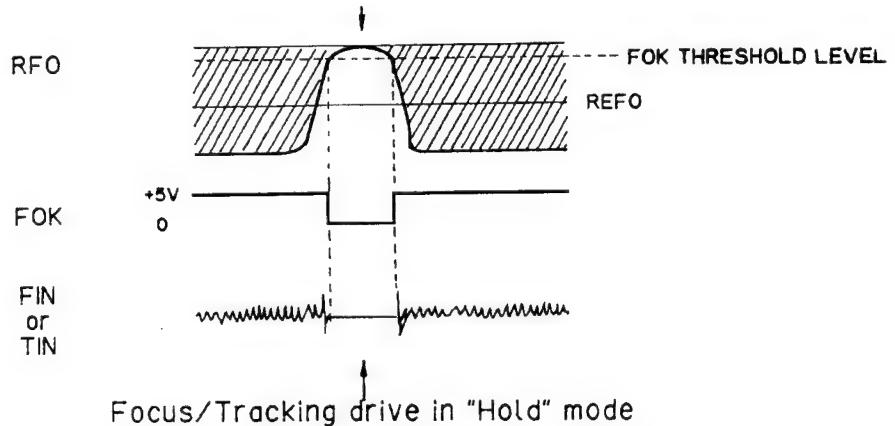


Fig.10 : DEFECT CIRCUIT

## b) FZD CIRCUIT

The FZD circuit inside the servo IC compares the absolute value of the FE signal to a threshold value and outputs a high/low signal which is then used in the focus close sequence as stated.

At power on, the microcomputer switches the laser diode off and reads the value of the FE bias via the servo LSI's A/D port. The FZD threshold is set 200mV above this bias level.

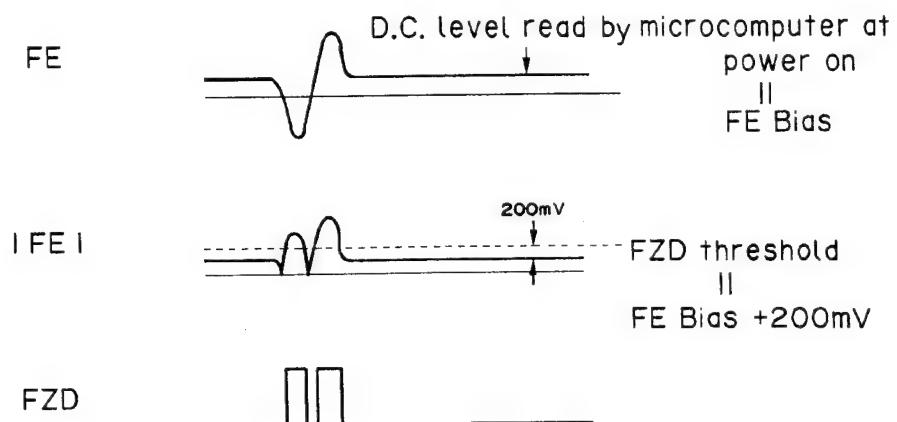


Fig.11 : FZD CIRCUIT

## 2) Tracking Servo System

The main tracking equalization takes place inside the UPD63700GF (figure 12). The equalizer response can be measured between TEX and TIN and will have the shape shown in figure 13.

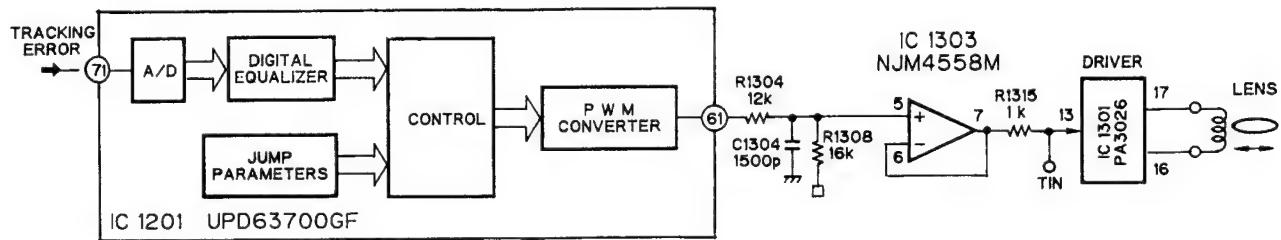


Fig.12 : TRACKING SERVO BLOCK DIAGRAM

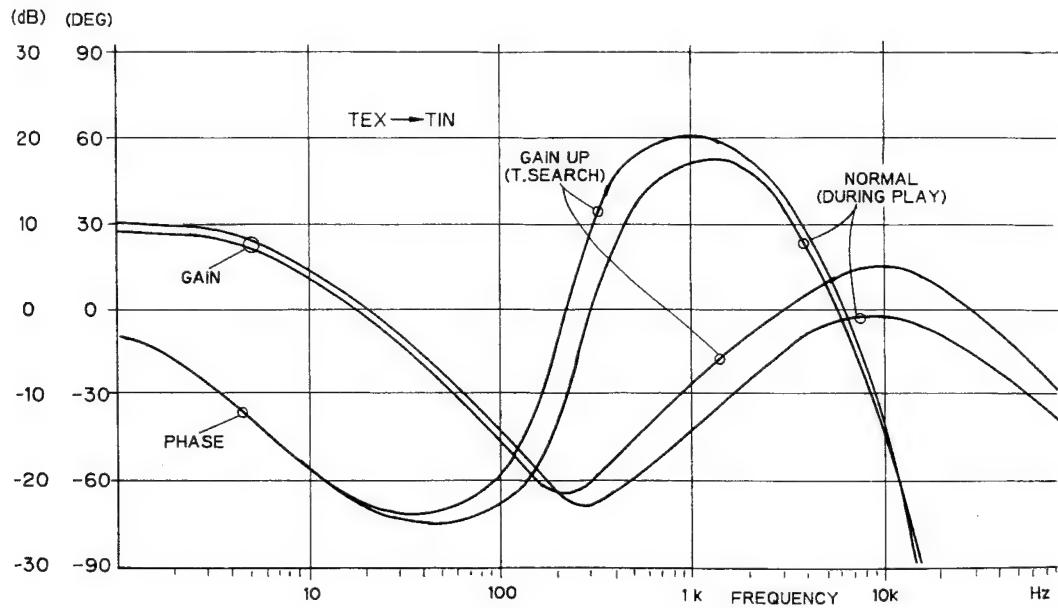


Fig.13 : TRACKING EQUALIZER

### a) Track Jumping

Track jumping is performed automatically by the servo LSI upon receipt of the appropriate command from the microcomputer. The present microcomputer is programmed to use 1,4,10 & 32 track jump commands to achieve searching. The 32 track jump command may be used in pairs (64 tracks) or triplets (100 track) as required. In TEST MODE the 1,4,10,32 & 100 track jump and carriage move sequences may be observed by selecting the appropriate mode.

Note that the number of tracks jumped is controlled by setting an internal counter to half the total value and then counting this down using the zero crossing edges of TEC1. Once the counter is at zero, a brake pulse of

fixed duration is output to bring the lens to a halt; allowing tracking to be closed and normal play to continue.

For a fixed period of time after a multi-track jump has been performed, a "tracking brake" circuit is activated in conjunction with a "gain-up" equalizer to ensure that the servo achieves stabilization before entering normal play.

Manual track search, in normal mode, uses a group of single track jumps to achieve FWD/REV at approx. ten times normal play speed.

The figures 14 & 15 show the timing charts for the single and multiple jump commands.

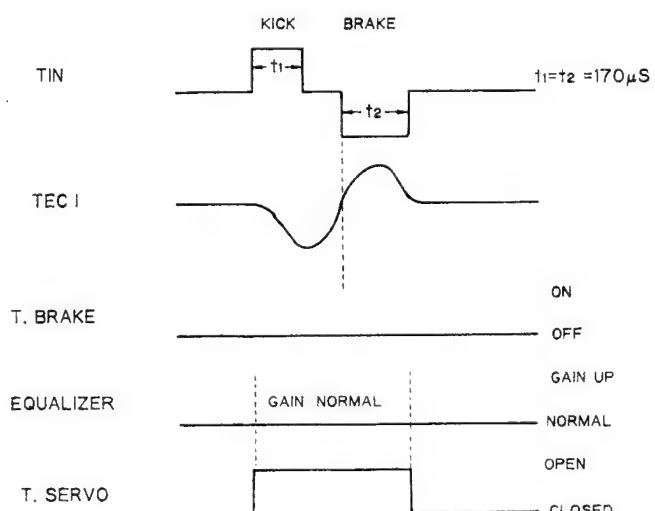


Fig.14 : SINGLE TRACK JUMP

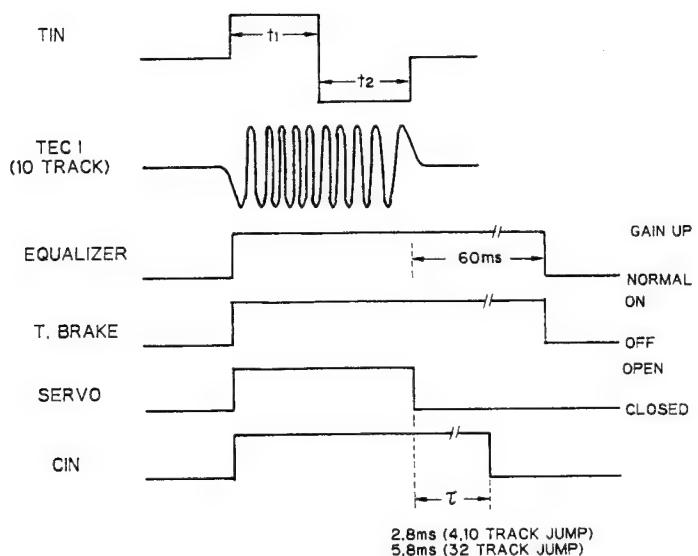
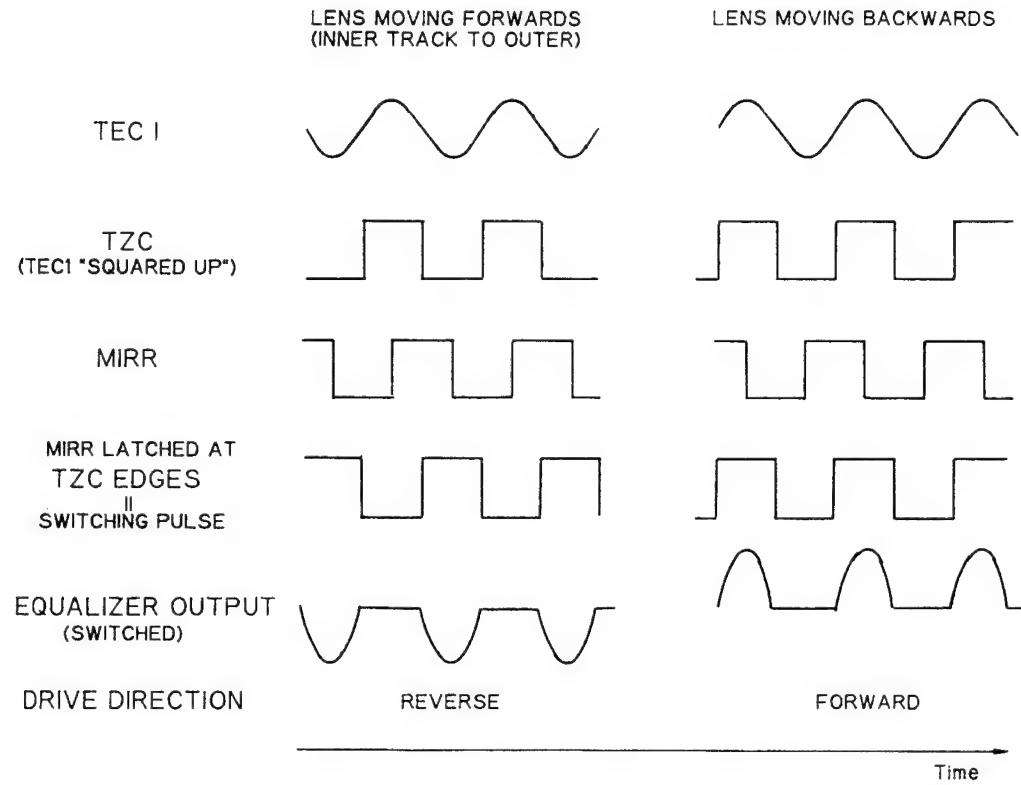


Fig.15 : MULTI TRACK JUMP

**b) Tracking Brake Circuit (Figure 16)**

This relies on determining which direction the lens is moving and only outputting the portion of the drive waveform which acts to oppose this motion. Direction

of motion is deduced from TEC1 and the MIRR signal and knowledge of their phase relation.



Note : Equalizer output assumed to have same phase as TEC1.

Fig.16 : TRACKING BRAKE CIRCUIT

## c) MIRROR Circuit

The MIRR circuit indicates if the laser beam is on or off track. MIRR = 'H' => off track, MIRR = 'L' => on track.

MIRR is generated by detecting the upper and lower envelopes of the RFO waveform and producing a difference signal which is then compared with a peak-held version of itself to determine if the envelope size has dropped below a certain percentage.

If so, this is assumed to be due to the beam going off-track ; in practice dirt on the disc can also give the same effect (see figure 17).

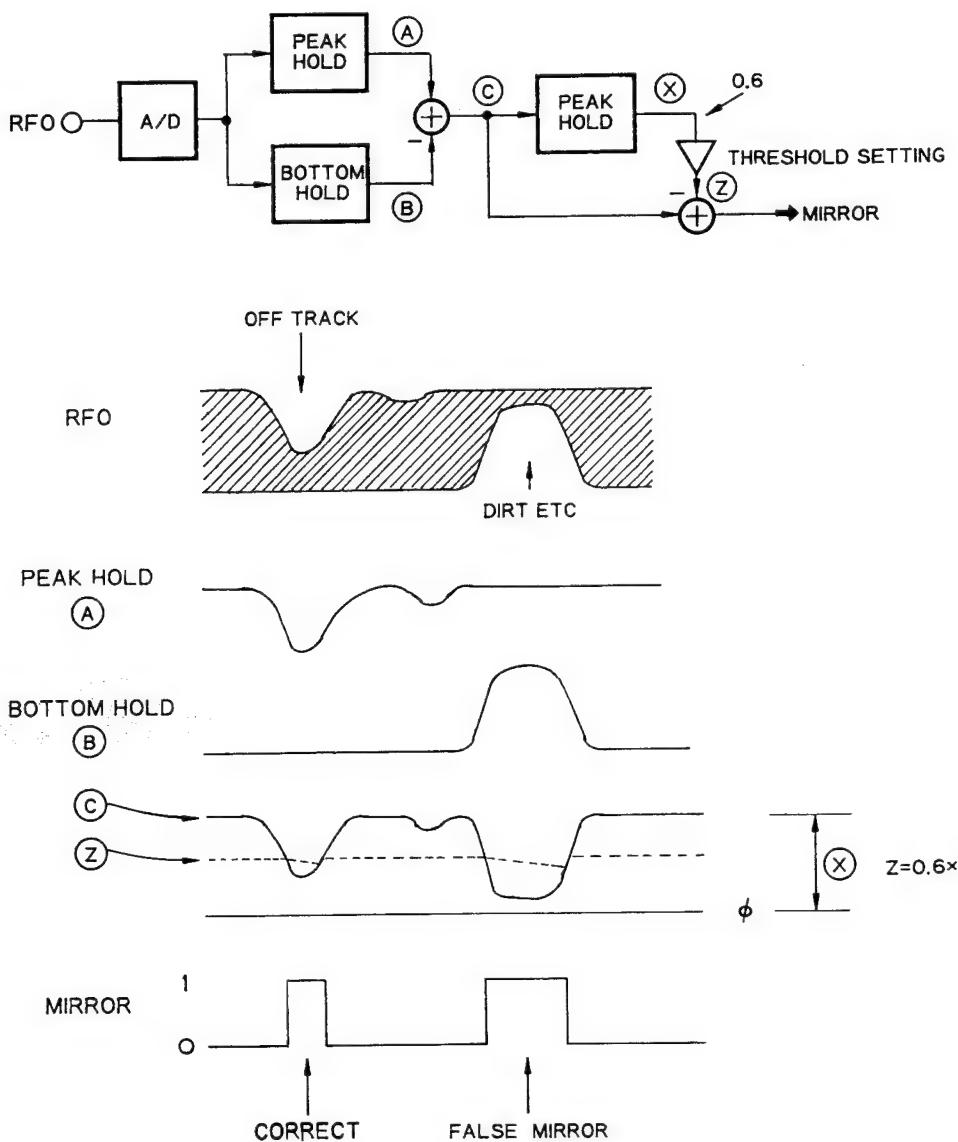


Fig.17 : MIRROR CIRCUIT & SIGNAL DIAGRAM

### 3) Carriage Servo System

The carriage servo system takes its input from the low frequency component of the tracking equalizer output. This is amplified and equalized, and the output fed to the carriage motor via the PWM converter, LPF and driver IC. The gain of the equalizer is set so that when the lens is offset from its center by a set amount the voltage at the carriage motor is enough to overcome friction and move the carriage forward.

Because the carriage motor will only begin moving when the applied voltage is great enough to overcome friction the drive voltage is cut-off inside the servo LSI until it reaches an appropriate level ; thus saving on wasted power dissipation.

Due to eccentricity of the disc etc. the threshold level may be crossed several times before the carriage assembly actually moves. This can result in a series of pulses being applied to the carriage motor.

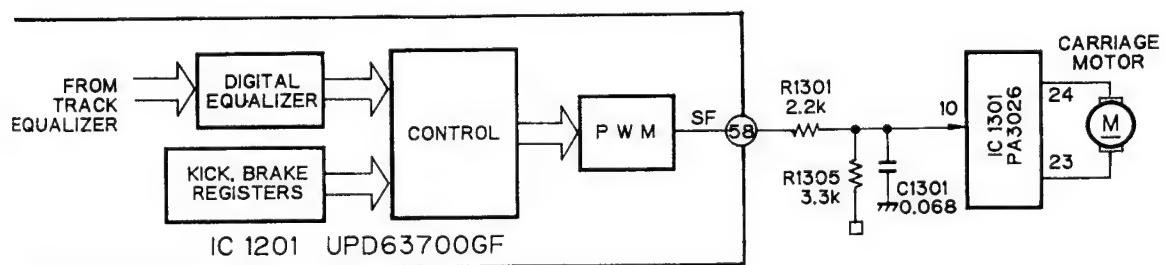


Fig.18 : CARRIAGE SERVO CIRCUIT

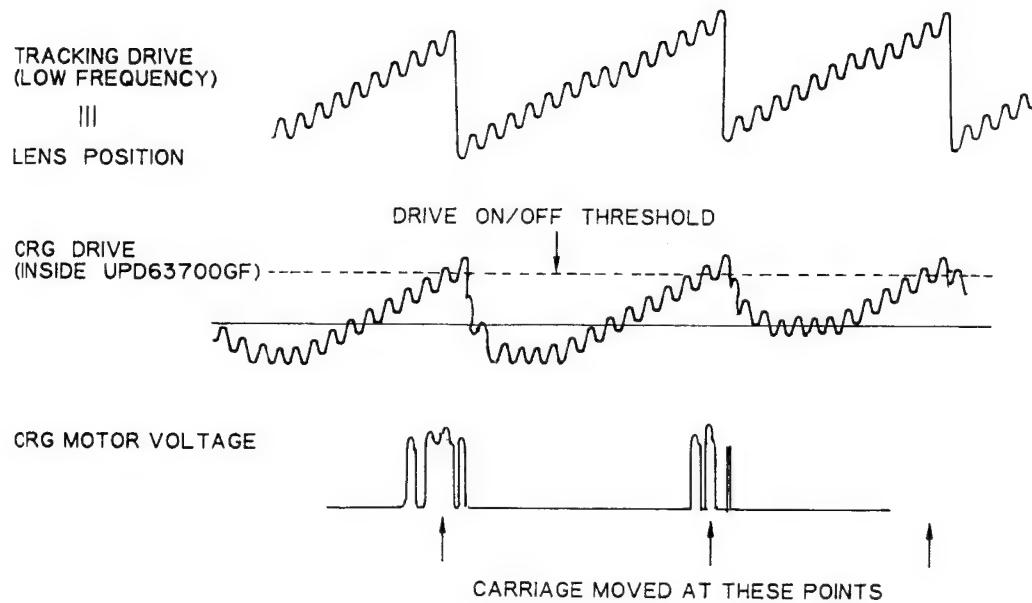


Fig.19 : CARRIAGE WAVEFORM

#### 4) Spindle Servo

The spindle servo has a number of different modes :

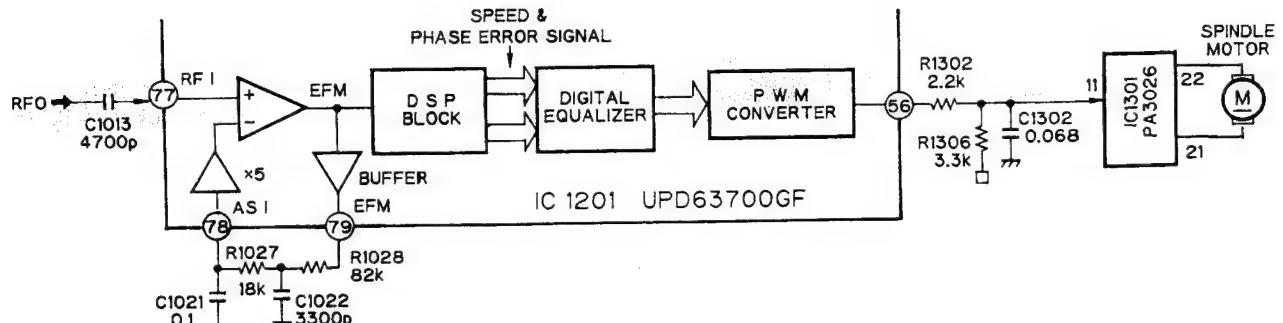
- (i) Kick : Used at set-up to bring the spindle up to speed from stand-still.
- (ii) Offset : This is used i) At set-up, after spindle kick and before AGC has finished.  
ii) During play if focus is suddenly disrupted.
- (iii) Adaptive Servo : This is the CLV mode which ensures that the linear velocity of the disc as seen by the laser spot is kept constant. During play, a timing signal is extracted from the EFM signal and used to generate speed and phase error signals. These error signals are summed and fed into a servo equalizer to produce a drive signal via the PWM converter.
- (iv) Brake : This is used to bring the disc to a stop quickly, for ejection or when CD source is deselected or for any other reason. The servo LSI puts out a brake level and monitors the EFM signal. When the longest pattern in the EFM signal is longer than a fixed amount an internal flag is set. By monitoring this flag the microcomputer can judge when the disc has stopped and proceed to eject etc. If this flag is not set within a certain time limit the servo is switched to STOP mode and eject is implemented after a wait period.

- (v) Stop : This occurs at power on or during disc eject. The spindle motor voltage is zero.

- (vi) Rough : This is used in normal mode to control the linear velocity of the disc when the carriage is being moved for fast access. A speed signal is deduced from the EFM waveform and input to the spindle equalizer. This mode should be used in TEST MODE to perform the grating adjustment.

##### a) EFM Comparator

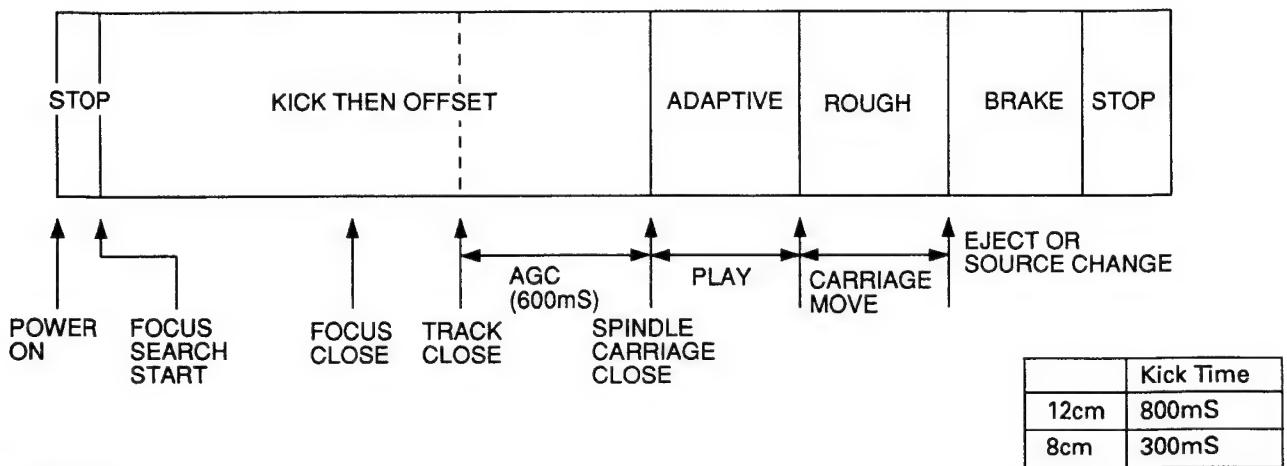
This circuit 'squares' up the analog RF signal into a digital EFM signal. In order to ensure minimum errors it is necessary to use a feedback circuit to match the DC level of the threshold to the center of the RF waveform. This circuit (shown in the spindle servo block diagram) uses the fact that the EFM signal should have no DC component. By feeding back the EFM signal's DC level the threshold level changes until the DC level is zero and the threshold, by definition, is at the exact center of the RFI waveform. The filtering in the feedback has been adjusted to ensure minimum error.



(EFM Comparator Circuit)

Fig.20 : SPINDLE CIRCUIT

## • Normal Mode



## • Test Mode

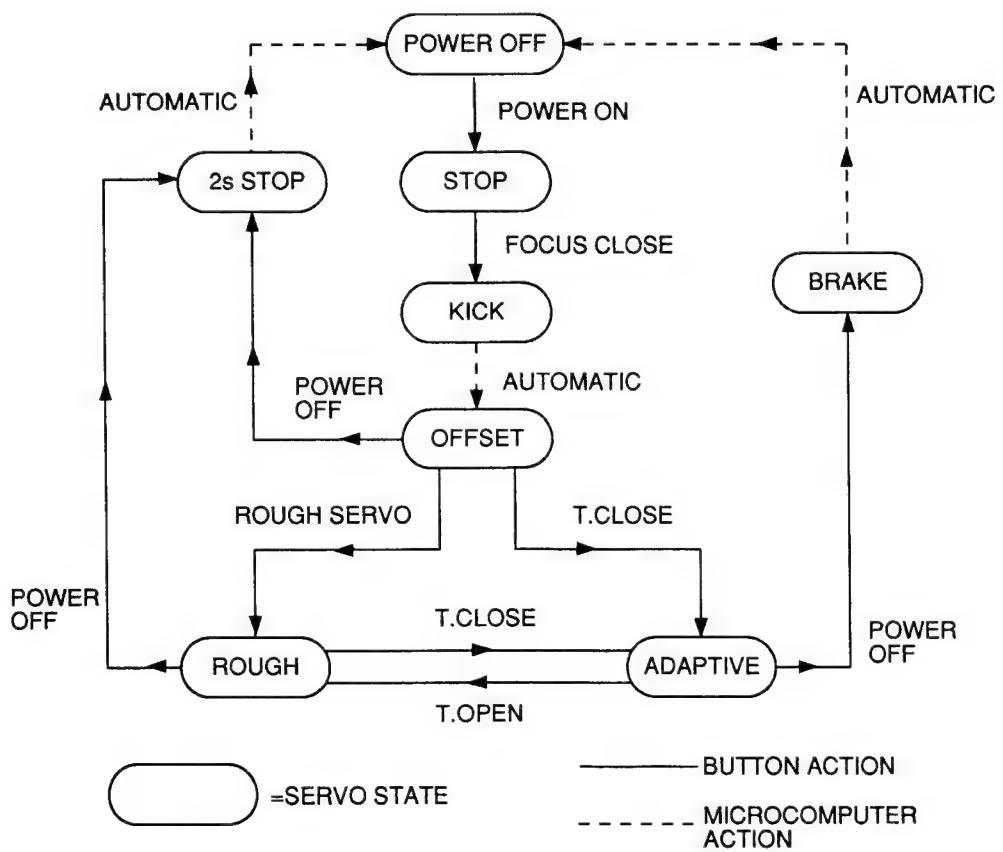


Fig.21 : SPINDLE SERVO MODES

## 5) Automatic Gain Control (AGC)

The servo LSI UPD63700GF contains a new function which allows the microcomputer to automatically adjust the gain of the focus and tracking servos every time a new disc is inserted or the CD source is selected. The block diagram of the AGC circuit is shown in figure 22. Basically, a small disturbance signal is inserted into the servo loop at a fixed frequency and the response of the loop is measured via the filtered signals G1 and G2. For a properly adjusted servo loop the amplitudes of G1 and G2 should be equal. The microcomputer reads in these values, does a simple calculation and adjusts the loop gain appropriately.

In order to achieve a high degree of accuracy this adjustment is performed a number of times.

As long as there is power supplied to the microcomputer it remembers the previous adjustment point and uses this as a starting point. Thus, should the system degrade with time (actuator sensitivity, dirt build-up, circuit degradation etc.) the microcomputer can follow this trend and keep the loop gain optimized. If power to the microcomputer is removed, it forgets the previous adjustment point and assumes a default value.

At shipping the CD player will be within 5dB of this default and no problems should occur. For an older player however this is not so and it is possible that servo closure may not take place immediately. In this case, the microcomputer adjusts the gain 'blind', searching for a stable point.

In TEST MODE, the result of the AGC can be monitored. Once tracking close (with AGC) has been performed the set can be made to display the present value of the gain block. The default value is displayed as '20', which is the value a typical PU unit, PCB & test disc would result in. If for some reason the loop gain had dropped by, say, 6dB (1/2 the typical value) then the gain block will be adjusted during AGC to twice its default value; resulting in a gain of '40'. Similarly a set with a loop gain twice the typical will display '10' as the present gain.

Using this, it is possible to 'measure' the loop gain of the servo without the need for any instrumentation. The players shipped from the factory are checked with a test disc so that the value of the gain block after AGC is within the range 11 - 45.

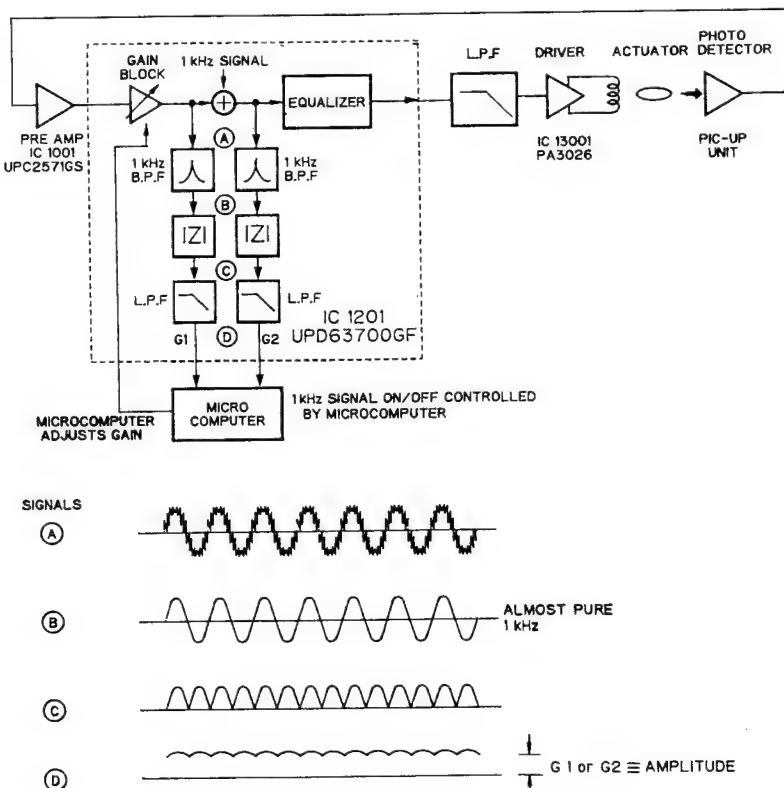
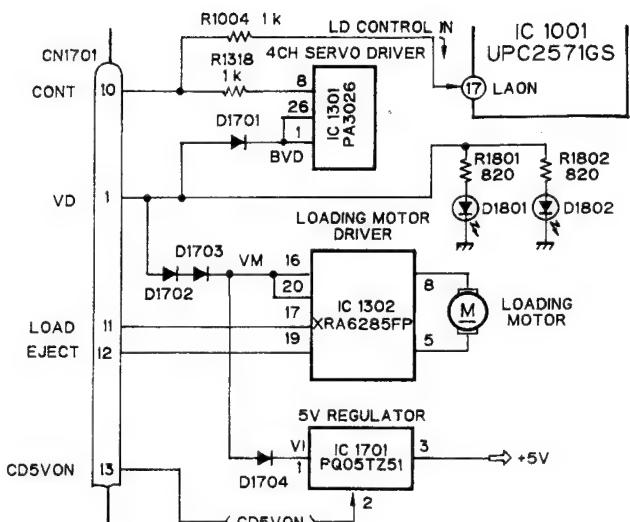


Fig.22 : AGC BLOCK DIAGRAM

## 6) Power Supply & Loading Motor

Figure 23 shows the block diagram of the power supply and loading motor.

The CD module receives VD (9V) and splits this up into BVD (8.3V), VM (7.6V), and V1 (7.0V) which supply the 4ch servo driver, loading motor and 5V regulator respectively. VD is also used directly by the disc detection LED's. The 4ch driver and laser diode are enabled by the CONT line from the microcomputer. The 5V supply to the servo LSI, pre-amp and audio circuits is enabled by the CD5VON line. The loading motor has no separate enabling input ; the control lines LOAD and EJ serve the same purpose.



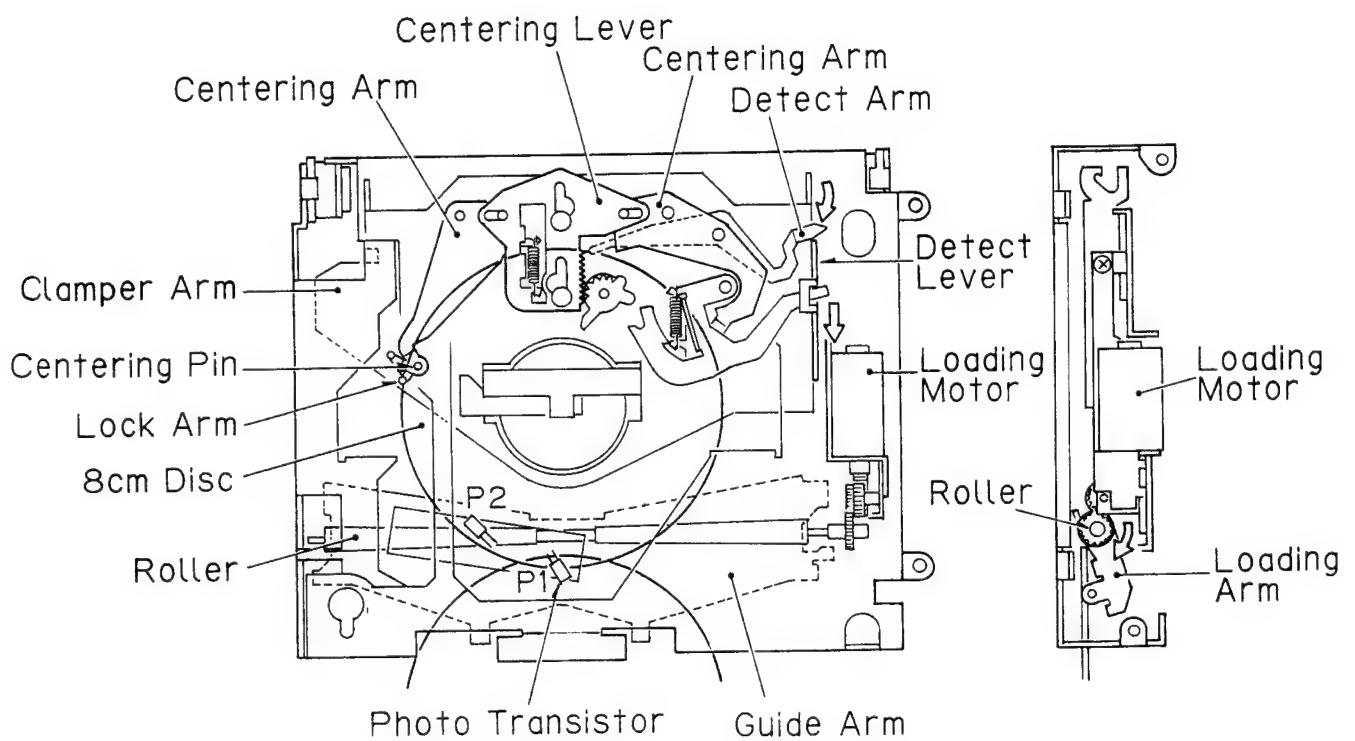


Fig.24

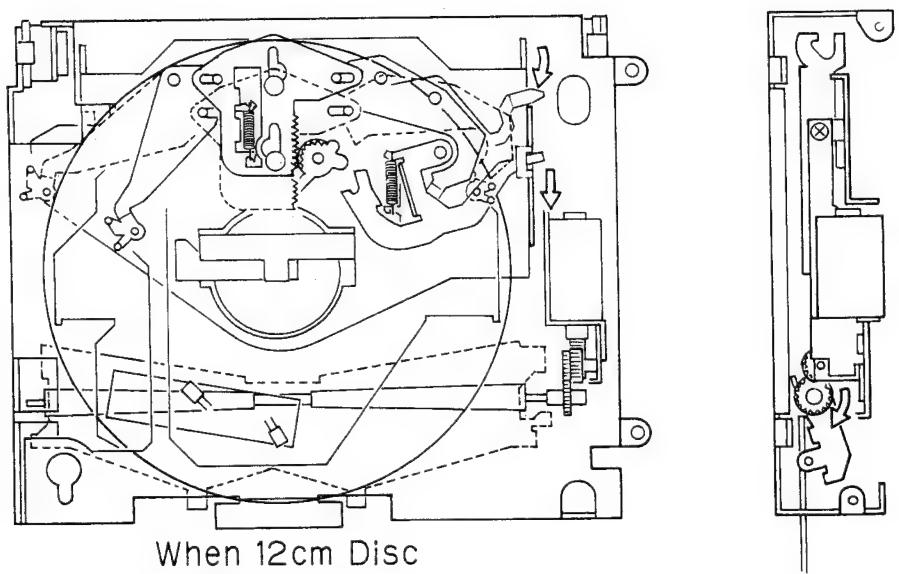


Fig.25

### ● Clamp Operation

1. The rack gear in contact with the detect lever is engaged with the gear driven by the loading motor, thereby moving the L arm in the arrow direction.

The clamper arm, which had been raised by the L arm, moves down and clamps the disc.

The lock lever which interlocks with the L arm moves the loading arm.

As a result, the rubber roller is pushed down, leaving the disc. At the same time, the guide arm moves down, too. At the position where the lock lever turns the clamp switch on, loading comes to an end.

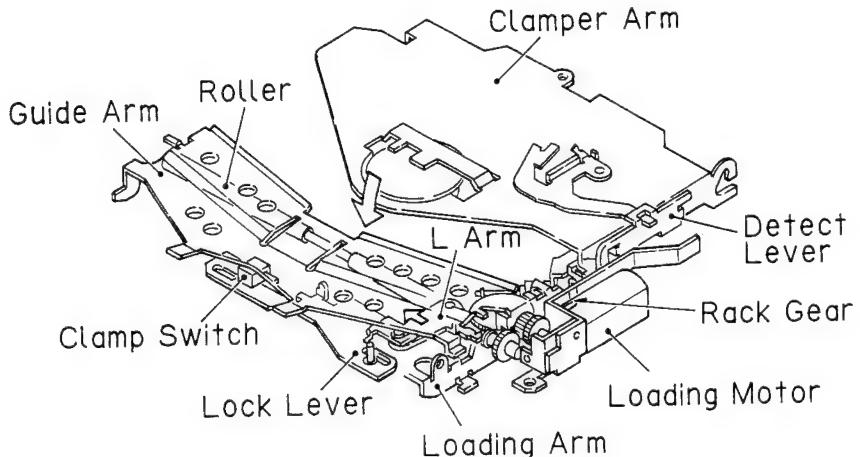


Fig.26

### ● Mechanism Lock

1. In the eject condition two lock arms are positioned in the frame hole and the front side of the floating section is locked in both vertical and horizontal directions.

The L arm moves the rotating lock lever to the left. The mechanical lock arms L and R move in the directions designated by the arrows and the floating section is released from the frame.

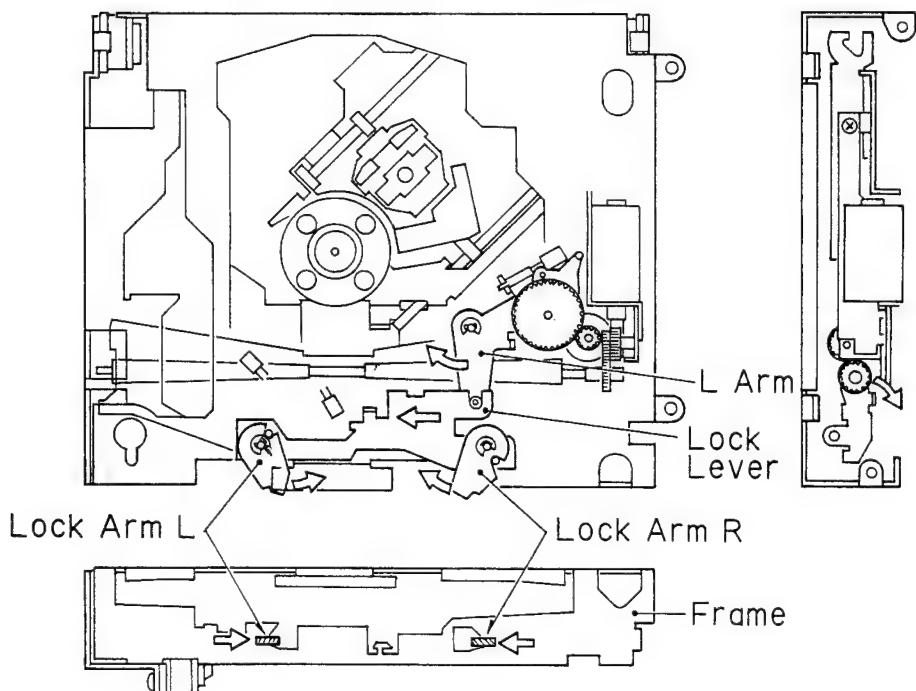


Fig.27

### ● Eject

1. The eject mechanism operates by reversing the rotation which takes place when the loading motor loads. The L arm moves and operates the mechanical lock, the clamp is released, the roller is applied, and the disc is conveyed. In the case of a 12cm disc the loading motor stops at the position at which the photo transistor lights at the rear of the rubber roller section.

However, in the case of an 8cm disc, motor revolution stops after a fixed period of time. In this process the disc type is recognized during play, by the voltage of the photo transistor(P1) located in front of the rubber rollers.

## 3. DISASSEMBLY

### ● How to Remove the Dampers

(Fig.28)

1. While keeping the CX-540 powered on, insert a disc and put it into play mode (with the arm unit lowered).
2. Power off the CX-540 while in play mode.
3. Unplug the connector and remove the CX-540.

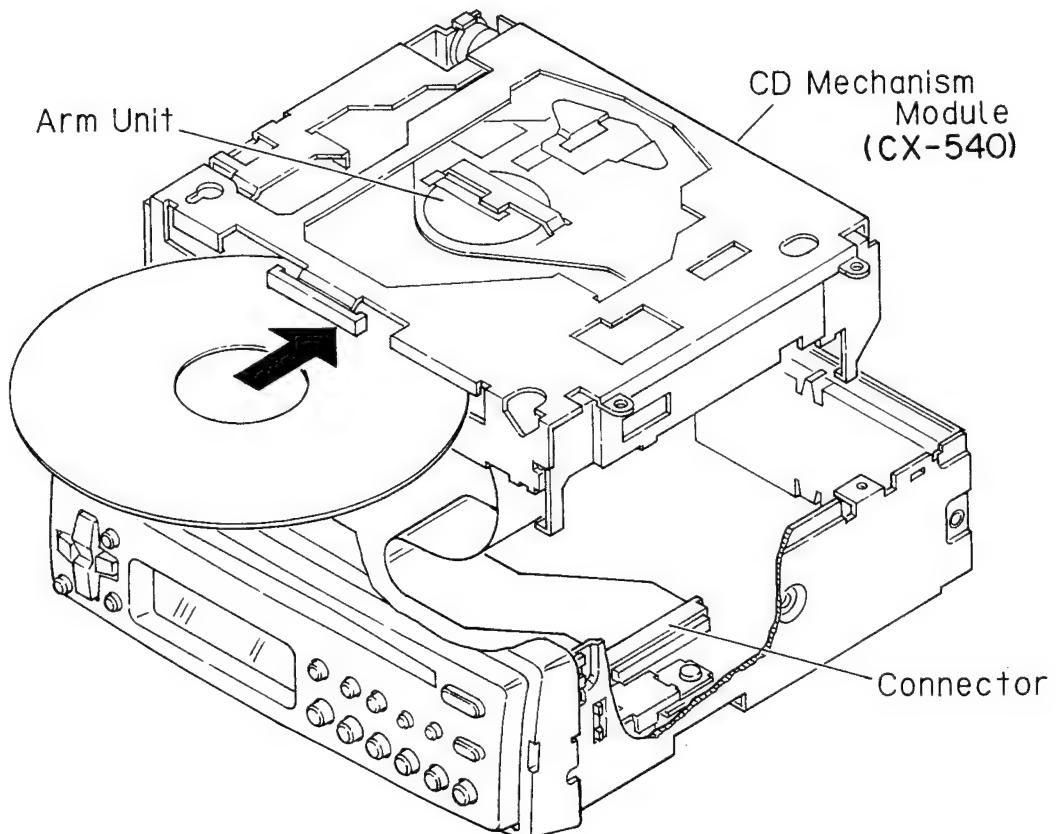


Fig.28

(Fig.29)

4. Unfasten the four screws marked with arrows.
5. Unfasten the two screws A and remove the frame.

6. Unfasten the two screws B and remove both damper and holder at the two locations.

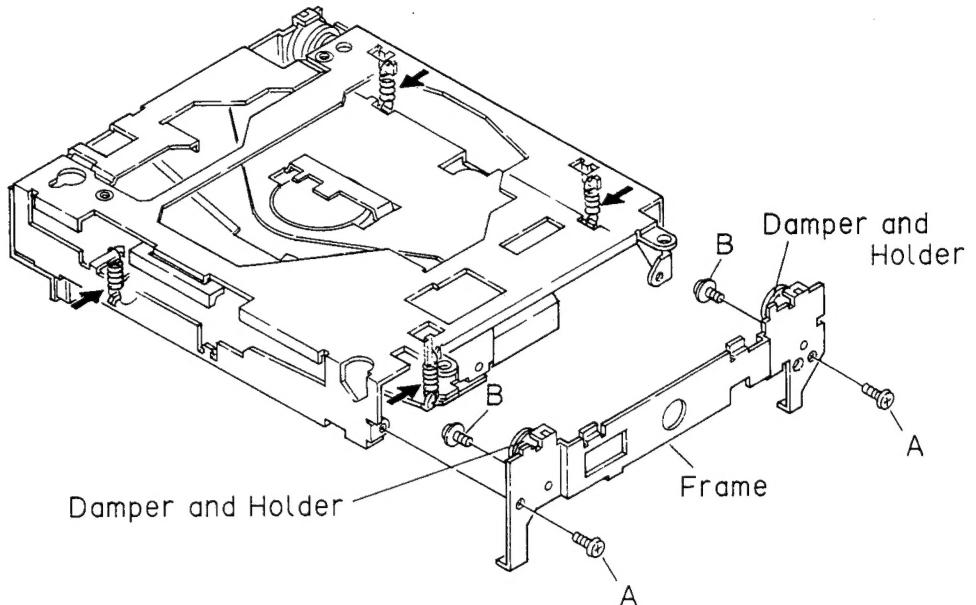


Fig.29

(Fig.30)

7. Remove the frame unit.
8. Unfasten the two screws and remove both damper and holder at the two locations.

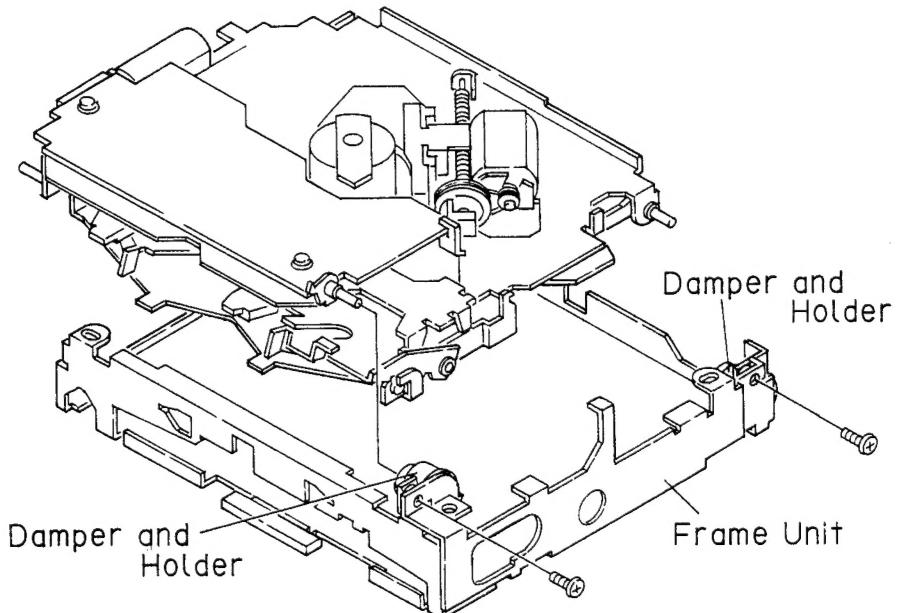


Fig.30

### ● How to Remove the Spindle Motor

(Fig.31)

1. Remove spring A as marked with an arrow.
2. Remove springs B and C and the arm unit.
3. Remove spring D and the lever.

4. Turn the support wheel so that the screw head becomes visible through the hole.
5. Unfasten the two screws and remove the spindle motor.

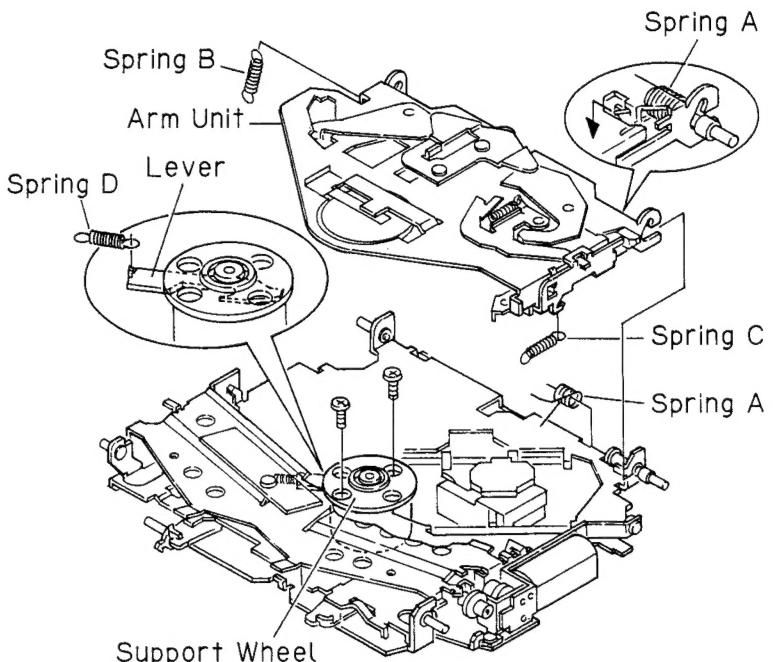


Fig.31

### ● How to Remove the Loading Motor

(Fig.32)

1. Remove the washer and the arm.
2. Remove the spring.

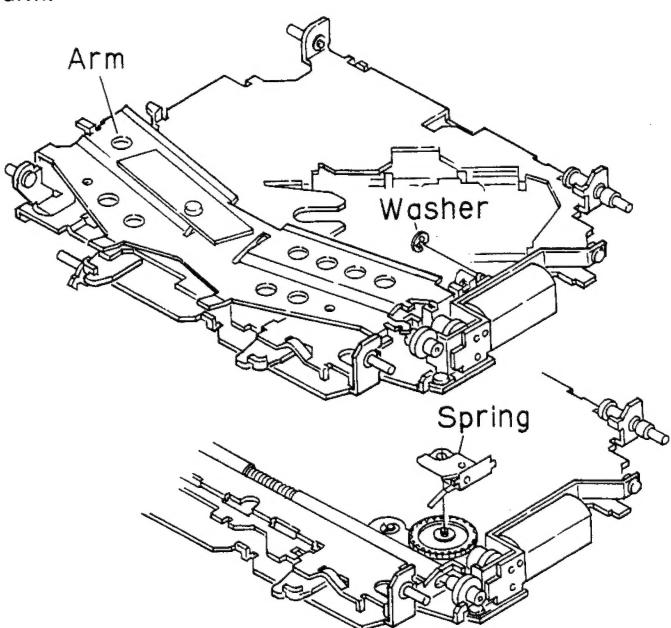


Fig.32

(Fig.33)

3. Unfasten the two screws and remove the bracket unit.

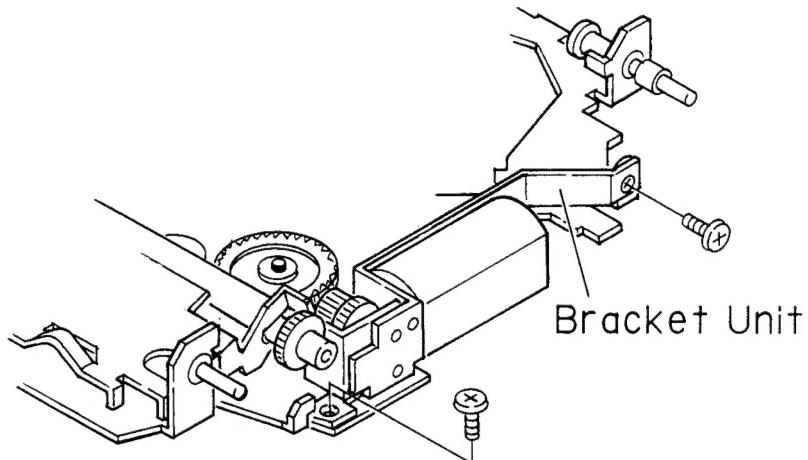


Fig.33

(Fig.34)

4. Unfasten screw C and remove both gear unit and gear.
5. Unfasten the two screws D and remove the loading motor.

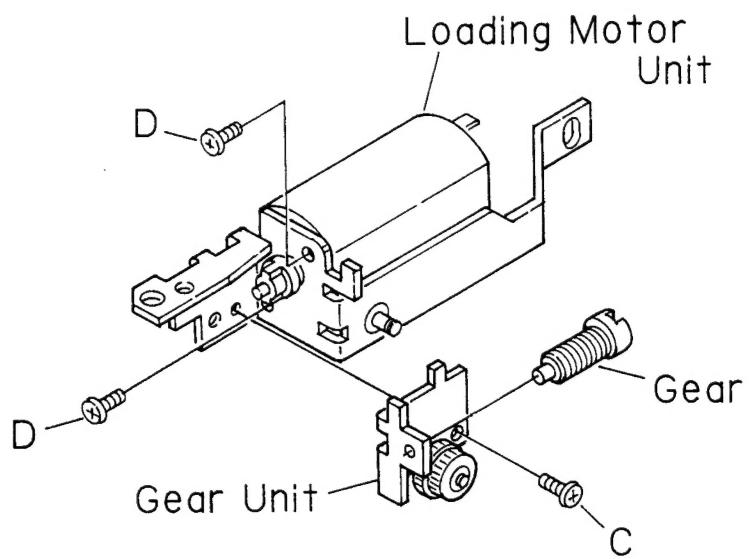


Fig.34

## ● How to Remove the PU Unit and the Carriage

### Motor

(Fig.35)

1. Latch spring E as marked with an arrow in the illustration.
2. Attach a short pin to protect the PU unit.
3. Unplug the connector.
4. Unfasten the screw and remove spring F.
5. Remove the PU unit.

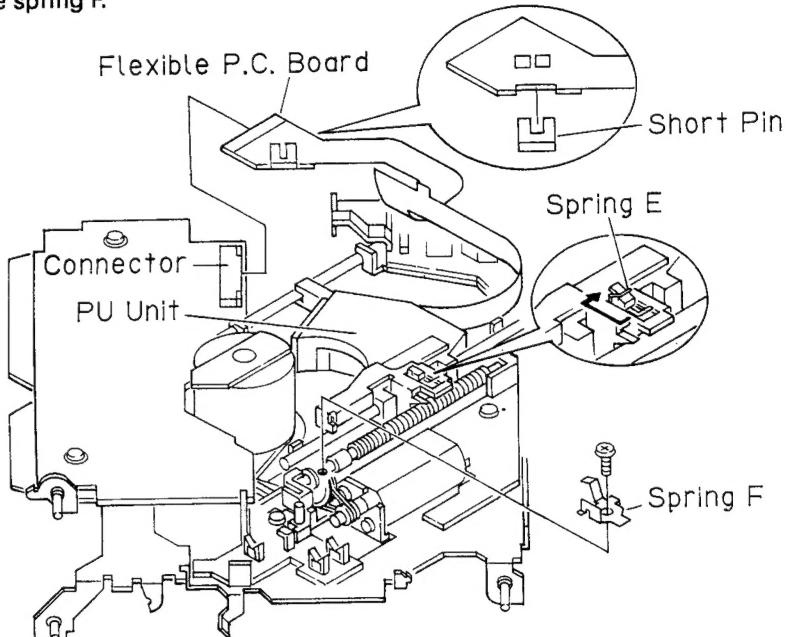


Fig.35

(Fig.36)

6. Unfasten screw E and remove the holder, belt and screw unit.
7. Unfasten the two screws F and remove the carriage motor.

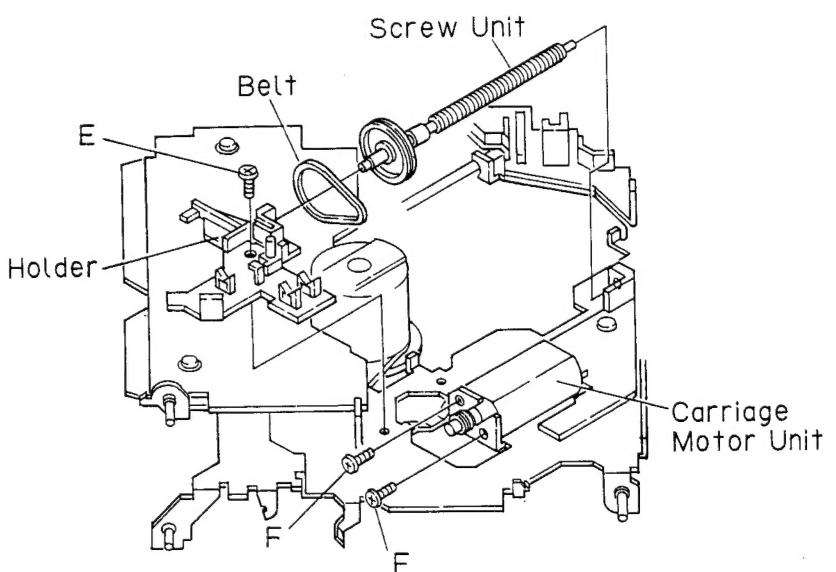


Fig.36